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ANNOUNCEMENT OF THE
TWENTY-EIGHTH SUMMER SESSION
and of the
SUMMER TERM OF THE COLLEGE
OF ARTS AND SCIENCES
JULY 5—AUGUST 15
1919

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This announcement is intended to give detailed information to prospective students in the Summer Session and the Summer Term of the College of Arts and Sciences.

For general information concerning the University and the work in its various colleges during the academic year, the requirements for admission, etc., the General Circular of Information should be consulted. This and the other publications of Cornell University are listed on the last page of the cover of this pamphlet. Any one of the informational publications there mentioned will be sent gratis and post-free on application to the Secretary of Cornell University, Ithaca, New York.

CALENDAR

SUMMER SESSION 1919

In order to get the full number of exercises announced for the Summer Session, it is necessary that all work begin promptly on Monday morning, July 7. Students are, therefore, urged to reach Ithaca in time to be present at the first exercise in each class. If possible, they should register on Saturday, July 5; if not, they should register on Monday during the hours not occupied in class work.

July 5, Saturday,	8 a. m. to 5 p. m. Registration at office of Registrar.
July 7, Monday,	Instruction begins at times and places announced under each course. Registration continued.
July 8, Tuesday evening,	Organ Recital, Sage Chapel.
and following Tuesdays,	
July 10, Thursday evening,	Pianoforte Lecture-Recital by Mr. E. R. Kroeger, Barnes Hall.
and following Thursdays,	
July 12, Saturday, before 1 p. m.	Last day for payment of fees at the Treasurer's Office, 1 Morrill Hall.
July 13, Sunday evening,	Organ Recital, Bailey Hall.
and Aug. 3 and 10,	
July 14, Monday evening,	First lecture in Monday evening course. Continued on following Mondays. Rockefeller Hall.
July 20 and 27, Sunday,	Community Singing, Bailey Hall.
August 14, 15, Thursday and Friday,	New York State Examination for Teacher's Certificates.
August 15, Friday,	Summer Session closes.

SUMMER SESSION 1919

OFFICERS

Jacob Gould Schurman, LL.D., President of the University.
David Fletcher Hoy, M.S., Registrar of the University.

ADMINISTRATIVE BOARD OF THE SUMMER SESSION

James Edwin Creighton, Ph.D., Dean of the Graduate School.
Frank Thilly, Ph.D., Dean of the College of Arts and Sciences.
Dexter Simpson Kimball, M.E., Representing the Professional Colleges.

Executive Committee

Robert Morris Ogden, Ph.D., Chairman.
Benton Sullivan Monroe, Ph.D., Secretary.

*STAFF OF INSTRUCTION

Joseph Quincy Adams, jr., Ph.D., Assistant Professor of English	English
Arthur A. Allen, Ph.D., Assistant Professor of Ornithology.	Ornithology
Charles Ethan Allen, B.A., Instructor in Histology and Anatomy, Albany Medical College.	Physical Education
Eugene Plumb Andrews, A.B., Assistant Professor of Archaeology.	Greek and Archaeology
William C. Ballard, jr., Assistant Professor of Electrical Engineering.	Music
Leila Bartholomew, Teacher of Music, Grammar Schools, Ithaca.	Music
Harold Arthur Bedient, A.B., Assistant in Chemistry.	Chemistry
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Carl William Bock, Ph.D., Instructor in Psychology.	Psychology
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Thomas Roland Briggs, Ph.D., Assistant Professor of Chemistry.	Chemistry
Leslie Nathan Broughton, Ph.D., Assistant Professor of English.	English
Arthur Wesley Browne, Ph.D., Professor of Chemistry.	Chemistry
Laura Bryant, Supervisor of Music, Ithaca Public Schools.	Music
Murray Wright Bundy, M.A., Instructor in English.	English
Clayton Joseph Buttery, A.B., Instructor in French, Haverford School for Boys.	French
Bruce A. Carey, Conductor Elgar Choir, Hamilton, Canada.	Music
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Emile Monnin Chamot, Ph.D., Professor of Chemistry.	Chemistry
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Ralph Thomas Kline Cornwell, B.Chem., Assistant in Chemistry.	Chemistry
Frank H. Cowles, Ph.D., Professor of Latin, Wabash College.	Latin
Clyde Firman Craig, A.B., Assistant Professor of Mathematics.	Mathematics
James Edwin Creighton, LL.D., Professor of Philosophy.	Philosophy
Hollis Dann, Mus.D., Professor of Music.	Music
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Marcelle Delattre, Teacher of French, Washington, D. C.	French
Alexander M. Drummond, A.M., Assistant Professor of Public Speaking.	Public Speaking
Charles Love Durham, Ph.D., Professor of Latin.	Latin

*The names of the instructors in the College of Agriculture are given on page 55.

- Ellsworth David Elston, B.A., Instructor in Physical Geography. Physical Geography
- Donald English, M.B.A., Professor of Economics. Economics
- John Edward Foglesong, Ph.D., Instructor in Chemistry. Chemistry
- William Silliman Foster, Ph.D., Assistant Professor of Education. Education
- Dean La Fever Gamble, B.S., Instructor in Zoology. Zoology
- Jean Marius Gélais, Instructor in U. S. Military Academy, West Point. Physical Training
- Raymond Garfield Gettell, A.M., Professor of Political Science, Amherst College. Government and Social Science
- Roswell Clifton Gibbs, Ph.D., Professor of Physics. Physics
- David Clinton Gillespie, Ph.D., Assistant Professor of Mathematics. Mathematics
- Frank Alexander Griffin, Assistant in Chemistry. Chemistry
- J. Earl Griffith, Head of Department of Drawing and Art, Central High School, Newark, N. J. Drawing and Art
- George Livingston Hamilton, Ph.D., Professor of Romance Languages and Literatures. Italian
- William Alexander Hammond, Ph.D., Sage Professor of Ancient Philosophy and of Aesthetics. Philosophy
- Archie Bernhard Hoel, B.A., Assistant in Chemistry. Chemistry
- William H. Hoerrner, Professor of Music, Colgate University. Music
- Louis Benjamin Hoisington, B.A., Instructor in Education. Education
- Harley Earle Howe, Ph.D., Assistant Professor of Physics. Physics
- Jesse W. Hubbard, A.M., Head of Department of Geography, Massachusetts State Normal School. Geography
- Helen Allen Hunt, Teacher of Music, Boston, Mass. Music
- Everett Lee Hunt, A.B., Assistant Professor of Public Speaking. Public Speaking
- Wallie Abraham Hurwitz, Ph.D., Assistant Professor of Mathematics. Mathematics
- John Irwin Hutchinson, Ph.D., Professor of Mathematics. Mathematics
- Stuart Deming Jackson, A.B., Instructor in Chemistry. Chemistry
- Fernand D. A. D. Jagu, Licencié en droit, Instructor in the Romance Languages. French
- Arthur Edward Johnstone, Teacher of Music, New York City. Music
- Ralph Hayward Keniston, Ph.D., Assistant Professor of Romance Languages and Literatures. Spanish
- Ernest R. Kroeger, Teacher of Music, St. Louis, Mo. Music
- Claude W. Leister, Assistant in Ornithology. Zoology
- Earl Albert Louder, B.S., Assistant in Chemistry. Chemistry
- Clinton P. McCord, M.D., Instructor in Hygiene, Albany Medical College. Physical Education
- Mercedes Manosalva, Scholar of the Chilian Government, Winthrop College. Spanish
- James Frederick Mason, Ph.D., Professor of Romance Languages. French
- David Earl Mattern, B.A., Teacher of Music, Ithaca Public Schools. Music
- Asa Emanuel McKinney, Assistant in Chemistry. Chemistry
- Ernest George Merritt, M.F., Professor of Physics. Physics
- Pierre Mertz, A.B., Instructor in Physics. Physics
- Benton S. Monroe, Ph.D., Assistant Professor of English. English
- Guy Brooks Muchmore, B.A., Assistant Professor of Public Speaking. Public Speaking
- Carleton Chase Murdock, A.M., Instructor in Physics. Physics
- Melvin Nicholas, B.Chem., Instructor in Chemistry. Chemistry
- Clark Sutherland Northup, Ph.D., Assistant Professor of English. English
- Robert M. Ogden, Ph.D., Professor of Education. Education
- William Ridgely Orndorff, Ph.D., Professor of Chemistry. Chemistry
- Frances Ottley. Music
- Frederick William Owens, Ph.D., Assistant Professor of Mathematics. Mathematics
- Helen Brewster Owens, Ph.D., Instructor in Mathematics. Mathematics

Paul Russel Pope, Ph.D., Professor of German.	German
James T. Quarles, A. A. G. O., University Organist and Assistant Professor of Music.	Music
Hugh Daniel Reed, Ph.D., Assistant Professor of Zoology.	Zoology
Harold Lyle Reed, Ph.D., Assistant Professor of Economics.	Economics
Arthur John Rider, M.S., Instructor in Chemistry.	Chemistry
Heinrich Ries, Ph.D., Professor of Geology.	Geography and Geology
Guillermo Rivera, M.A., Instructor in Spanish, Harvard University.	Spanish
Louis A. Roux, B.A., Teacher of French, Newark Academy.	French
Burton T. Scales, M.A., Director of Music, Girard College.	Music
Nathaniel Schmidt, A.M., Professor of Semitic Languages and Literatures.	History
Bernadotte Everly Schmitt, M.A. (Oxon.), Ph.D., Associate Professor of History, Western Reserve University.	History
Albert Ray Shadle, M.S., Assistant Professor of Zoology.	Zoology
Lewis Piaget Shanks, Ph.D., Assistant Professor of French, University of Wisconsin:	French
Francis Robert Sharpe, Ph.D., Assistant Professor of Mathematics.	Mathematics
Hubert Sheppard, A.M., Instructor in Psychology.	Psychology
Luis N. Sherwell, Teacher of Spanish, Stuyvesant High School, New York City.	Spanish
Sutherland Simpson, D.Sc., M.D., Professor of Physiology.	Physiology
Virgil Snyder, Ph.D., Professor of Mathematics.	Mathematics
William Strunk, jr., Ph.D., Professor of English.	English
Cory Sturgis, B.A., Assistant Professor of Romance Languages.	Spanish
Alfred Henry Sweet, Ph.D., Acting Assistant Professor of English History.	History
Frank Thilly, Ph.D., Professor of Philosophy.	Philosophy
Edward Bradford Titchener, Ph.D., Professor of Psychology.	Psychology
Abbott Payson Usher, Ph.D., Assistant Professor of Economics.	Economics
Georges Alphonse Louis Vattier, Bachelier-és-lettres, Licencié-és-lettres, Diplôme d'études supérieures, Professor of French at the Royal Military College, Kingston.	French
Oscar Diedrich von Engeln, Ph.D., Assistant Professor of Physical Geography.	Geography and Geology
Harry Porter Weld, Ph.D., Assistant Professor of Psychology.	Psychology
Bernice White, Instructor in Music, Hunter College, New York City.	Music
Cornelia Williams, Principal, South Hill School, Ithaca.	Music
E. Jane Wisenall, Teacher of Music in High Schools, Cincinnati, Ohio.	Music
Mary Evalena Wright, B.S., Assistant in Chemistry.	Chemistry
Ralph W. G. Wyckoff, B.S., Instructor in Chemistry.	Chemistry
Mabel Ford Yeomans, A.B., Instructor in Public Speaking, Grinnell College.	Public Speaking

OBJECT OF THE SUMMER SESSION

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited to specialists who wish to pursue their individual study; or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the class room, the University's libraries, museums, laboratories, and shops are open for use.

2. College students in Cornell or other universities who wish to use some of the "long vacation," especially those returning from war service, or those who desire to complete a year's work begun on December 30, 1918. In the case of graduates some of the courses offered may be counted toward an advanced degree. See special circular of the Graduate School for details regarding opportunities for advanced work and research during the summer.

Undergraduates may anticipate requirements and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated on pages 8 and 9.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements. It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in formal study or teaching.

ADMISSION, ATTENDANCE, REGISTRATION

There is no examination for admission to the Summer Session. For conditions of admission to courses in the College of Agriculture, see page 57. Each person must, however, satisfy the instructor in charge of any course (unless it be elementary) that he is qualified to pursue the work. Any duly registered student of the Summer Session may visit such classes as he desires. **Admission to the class rooms is restricted to duly registered students.** Persons wishing to have work done during the Summer Session counted towards a degree, must conform to the regulations stated under the heading "Academic Credit for Work," page 8.

All students are required to register at the office of the Registrar in Morrill Hall. They may register on Saturday, July 5, between 8 a. m. and 5 p. m., or upon the day of their arrival, if they reach Ithaca later than July 6. Registration on July 5 is urged. Class exercises begin at 8 a. m., Monday, July 7. The Registrar's office is open from 9 a. m. to 4 p. m. every day except Saturday, when it is closed at noon.

Students who wish credit for graduate work must register also with the Dean of the Graduate School at his office, Room 22, Morrill Hall.

REGISTRATION FEE

A registration fee of \$5 will be charged each student who registers for the first time in the Summer Session. This will be paid only once; registration in a second year or in subsequent years will be without this fee. Matriculated students are not exempted from paying it on their first registration in the Summer Session. This fee will be collected with the tuition.

TUITION FEE

The single tuition fee, with the exceptions noted below, for the entire Summer Session, whether one course or more is taken, is \$30. This must be paid at the office of the Treasurer, Room 1, Morrill Hall, within five days after registration day. In case of withdrawal within five days from the first registration day, for reasons satisfactory to the Treasurer and the Registrar, the tuition paid may be refunded and the charge cancelled. In case of withdrawal within two weeks after the first registration day, one-half the tuition may be refunded. In case of registration after the first three weeks of the session, students must pay two-thirds of the full tuition fee. No student is admitted without the payment of this fee. Sibley College students taking shopwork are not exempted. Admission to classes is restricted to duly registered students.

For instruction in swimming and fencing an extra fee is charged. See p. 44.

Tuition in all subjects taught in the College of Agriculture is provided by the State of New York, and is free to **students registered therein who are residents of this State**. For all others the charge is the same as for other work, \$30. Free tuition does not include any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

On payment of \$30 tuition fee a person may take work in both the College of Agriculture and any other department.

LABORATORY FEES

Chemistry. A fee is charged for material actually consumed, and such deposit must be made with the Treasurer as the instructor may prescribe.

Physics. The fee in Physics is at the rate of \$1 for every five hours a week of work in the laboratory. The entire amount must be paid to the Treasurer at the beginning of the session.

Geography and Geology. In courses S 2 and S 9 in geography a fee of \$1 each must be paid in advance to the Treasurer to cover incidental expenses of the course.

Zoology. Fees are charged for material actually consumed. See the Courses.

Library Deposit. See under Library, page 10.

ACADEMIC CREDIT FOR WORK

In the College of Arts and Sciences. The requirements for the degree of Bachelor of Arts are residence for eight terms (four years), and the completion of one hundred twenty hours ("points") of elective work. A student who has satisfied the entrance requirements of the College, and has afterwards completed, in two or more Summer Sessions, at least twelve hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Under no circumstances shall work done in Summer Sessions be accepted as the equivalent of more than two terms of residence. The maximum amount of credit towards the A.B. degree which is allowed for the work of any one Summer Session is eight hours. In order to receive credit towards the A.B. degree a student must pass at least five hours, and must secure in advance the approval of the Dean for his choice of studies

In Other Colleges of the University. The nature and amount of credit allowed in these for work in the Summer Session may be learned from the statements under the announcement of each course.

In the Graduate School. Graduate work at Cornell is not expressed in terms of courses or hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may be admitted to candidacy for an advanced degree upon the recommendation of the professors under whom he proposes to work. The conferring of the degree itself does not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. It involves the writing of a thesis and the passing of a special examination. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered creditable for a degree must be of advanced character in some field or department of knowledge. No credit for residence towards a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the Session, and who does not formally become a candidate for this degree under the direction of a special committee. The latest day for such registration in 1919 is July 10.

During the summer of 1919, through the combination of the Summer Session with a regular Summer Term in several of the Colleges, the opportunities for graduate study are more complete and varied than usual. A number of departments that are ordinarily not represented in the program of the Summer Session this year offer courses, and among the teachers there is a larger proportion than usual of the senior members of the instructing staff. The Faculty of the Graduate School has voted to grant residence toward the degree of Doctor of Philosophy to candidates who pursue their studies at the University for a term of eight weeks during the summer of 1919. In certain departments members of the Faculty have announced their willingness to begin the direction of the work of graduate students before the opening of the Summer Session and to continue if necessary

after the close of that session. Students who wish to avail themselves of this privilege should in all cases correspond with some member of the department in which they wish to carry on studies.

In certain departments also an invitation is issued to scholars who are beyond the stage of regular graduate study to make use of the resources of the University in these fields for carrying on research.

A special pamphlet setting forth the opportunities for graduate study at Cornell University during the summer of 1919 has been published and will be sent on application to the Dean of the Graduate School.

CERTIFICATES FOR WORK DONE

Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 15, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

COST OF LIVING

The cost of board and furnished room in Ithaca during the Summer Session runs from \$9 a week upwards. In some cases the cost has been reduced to \$8, but it is not safe to count upon less than this sum.

The price of a single furnished room may be as low as \$2 a week. The prices advance with the size and location of the rooms.

Rooms are engaged with the understanding that they will be occupied for the entire session, unless otherwise agreed upon by both parties. Table board is usually engaged by the week, or, if so stated, by the day.

A list of desirable rooms in private houses may be had on application after June 1. Students are cautioned against unauthorized rooming house agents.

The price of table board runs from \$6 to \$8 in boarding houses. In cafeterias and restaurants, the average cost of meals amounts to about the same sum.

RESIDENTIAL HALLS, ROOMS, BOARD

1. **For Women.** The University has three residential halls for women in which board and rooms may be obtained during the Summer Session by registered students only.

Rooms in these buildings will be reserved in the order of application. Each application for a room must be accompanied by a deposit of \$5; otherwise the application will not be entered. If the room assigned is occupied by the applicant the amount of this deposit is held until the end of the session to cover the return of keys, damage to building or furniture other than ordinary wear and tear, and to insure the completion of the lease. The deposit is refunded if the applicant gives formal notice to the manager on or before June 15 that she wishes to withdraw her application.

In Sage College, which accommodates 175, the charge for room, table board, and a specified amount of laundry, will be, for the session, from \$58 to \$70 according to the size and location of the room.

In Prudence Risley Hall, which accommodates 151, the charge will be from \$64 to \$67 according to the room occupied.

In both buildings this charge includes lodging Friday night, July 4 (not earlier), breakfast Saturday, July 5, and all meals to and including breakfast Saturday, August 16.

Members of the Summer Session who do not room in Sage College or Prudence Risley Hall may obtain table board at either. The charge is \$7 a week.

In Cascadilla Hall a furnished room may be had for the six weeks of the Summer Session at a cost of \$18 to \$24. This building is furnished like the others but has shower baths and not tubs. In this building the University maintains a cafeteria restaurant where meals may be had at very reasonable rates.

Rooms and board may be secured in private houses. A list of approved houses may be had by writing the Secretary of the Summer Session after June 1. It is not safe to engage rooms in places not recommended by the University.

Undergraduate women students of Cornell and other colleges are expected to live in the Residential Halls or in other approved lodgings.

For room plans and all information relative to these halls, apply to Thomas Tree, Manager of Residential Halls, Sage College, Ithaca, N. Y.

2. For Men. Rooms in Baker Court will be available for men students. For room plans and all information concerning Baker Court, apply to the University Treasurer, Ithaca, N. Y.

Checks for reservation of room, or in payment of board bills, should be drawn to the order of Cornell University.

THE LIBRARIES

The University Library is open on week days from 8 a. m. to 10 p. m., except Saturday, when it is closed at 1 p. m. In this building are the main library, containing about five hundred thousand volumes, and most of the seminary and special libraries. The main reading room affords accommodations for over two hundred readers, and contains a selected library of over 8,000 volumes of reference works. Below stairs is the periodical room in which are kept the current numbers of about five hundred journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and of the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The Library of the College of Agriculture, in the basement of the Agronomy building, is open on week days from 9 a. m. to 5 p. m., except Saturday, when it is closed at 1 p. m. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the Department of Entomology on the fourth floor of the main building, is one of the most complete

of its kind in the United States. Nearly all the departments in which instruction is given have well-selected departmental libraries.

LECTURES, MUSICAL RECITALS, EXCURSIONS

In addition to the regular class room work there will be public lectures on Monday evenings.

There are also lectures of general interest each week in connection with the various departments. Notice of these will be given in the University Calendar.

Organ recitals will be given on Tuesday evenings in the Sage Chapel and on Sunday evenings, July 13 and August 3 and 10, in Bailey Hall, and piano recitals on Thursday evenings in Barnes Hall.

Wednesday evenings are devoted to the departmental conferences which are open to all interested. Notice of these will be given from week to week.

In connection with the work of several departments excursions are made to many points of interest. Some of these are open to members of the Summer Session. Notable for their attraction are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES

Ithaca is reached by either the Lehigh Valley or the Delaware, Lackawanna, and Western railroad. By the latter, a branch leaves the main line at Owego. Through trains run from New York and Buffalo on the Lehigh, and through sleeping cars run daily from New York on both roads. From Philadelphia, and from Baltimore, Washington, and the South via the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh at Bethlehem. On the Lehigh, through trains for Ithaca connect with the New York Central at Auburn, and with the Pennsylvania (Northern Central) and the Erie at Elmira.

COURSES OF INSTRUCTION

Most of the courses offered consist of five exercises a week, each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the number of weekly exercises by six.

The word "hour" used in speaking of University credit means the equivalent of one class exercise a week for a half year or one semester. One hundred and twenty such "hours" are required of candidates for the A.B. degree.

G. S. = Goldwin Smith Hall.

GREEK AND GREEK ART

S 1. First Year Greek. The essentials of grammar with composition and readings in the Greek New Testament. Daily except Sat., 8 and 12. G. S. 35. Credit, four hours. Assistant Professor ANDREWS.

This course affords an opportunity for those who have had no Greek to gain the ability to read the Gospel stories in the original. Earnest work will of course be necessary and the lesson assigned at eight o'clock will be recited at twelve. The work will lead up to the reading of the Gospel according to Mark. Textbook: Huddilston, Essentials of New Testament Greek.

S 2. History of Greek Art. Daily except Sat., 10. Museum of Casts. Credit, two hours. Assistant Professor ANDREWS.

Lectures in the Museum of Casts in Goldwin Smith Hall using the ample material there for the illustration of the development of Greek Sculpture. Lectures will be given also on Greek Vases, Coins, and Architecture. Textbook: Fowler and Wheeler, Greek Archeology.

LATIN

S 1. Fourth Year Latin, Virgil. Daily except Sat., 8 and 12. G. S. 128. Credit, four hours. Entrance credit, one unit. Professor COWLES.

This course is intended to afford any student the opportunity to complete by intensive work the reading ordinarily covered in the fourth year of the high school or preparatory course. The first six books of the Aeneid will be read.

In connection with the reading, attention will be given to the epic form, to prosody, with much practice in the oral reading of the dactylic hexameter, to mythology, and to rhetorical figures. Every effort will be made to present the epic as a great work of art. The syntactical side of the work will not be neglected, but an accurate knowledge of forms and inflections on the part of the student is assumed. Any standard text of Virgil may be used.

S 2. Latin Composition, and Teaching of it in the High School. Daily except Sat., 11. G. S. 128. Professor COWLES.

This course offers to teachers of Latin training in the theory and practice of composition, with discussion of methods, of difficulties incident to the work as exemplified by the experience of members of the class, and of the place of composition in classical study, with emphasis upon important idio-

matic usages and the elements of correct style. The work will embrace lectures and both oral and written exercises. The subject will be approached through the English, and the translation of the content will be emphasized, rather than the literal rendering of words. Attention will be given to the opportunities for work in derivatives afforded by composition. Teachers are requested to bring with them the textbooks in composition which they have been using.

S 3. Latin Language and Latin Syntax. A discussion of special topics in the history of the Latin language and a consideration of the most important and most characteristic features of Latin syntax. Daily except Sat., 9. Goldwin Smith 128. Professor DURHAM.

S 4. Catullus. Daily except Sat., 10. Goldwin Smith 128. Professor DURHAM.

Courses S 3 and S 4 are primarily for teachers and graduate students. Those who wish to begin their candidacy for the degree of Master of Arts are requested to correspond in advance with Professor Durham and to bring with them at the opening of the Summer Session such credentials of undergraduate work leading to the degree A. B. as will entitle them to admission to the Graduate School.

In addition to the regular courses S 3 and S 4 intended for advanced students, regular conferences will be held and lectures will be given on collateral subjects in the field of Latin study.

GERMAN

Courses S 1, S 2, S 3, afford the earnest worker an opportunity to gain a working knowledge of German by highly concentrated effort, and a chance to make a rapid review of previous reading.

The other courses are intended for teachers and for students of considerable proficiency in the subject. They present opportunity for advanced study in language, grammar, and literature, and also are intended to give direct practical assistance in the various problems which confront the teacher. Students are urged and encouraged in every possible way to use German in and out of the class room.

S 1. First Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 183. Professor POPE. Credit, four hours. Entrance credit, one unit.

This course affords an opportunity for those who have had no German to acquire a practical working vocabulary, to master the essentials of grammar, to learn to read easy German, and to begin conversational work in the language. As far as possible the language of the class room will be German. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Textbook: Zinnecker, *Deutsch für Anfänger*. After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German, or they may take the second year German course during the first term of the regular college year. Dr. POPE will be in Room 182, T Th, 9, to give special assistance to members of this class.

This course also affords teachers of German an opportunity for observation of methods of teaching.

S 2. Second Year German. Review of grammar and reading. Daily except Sat., 8 and 12. G. S. 183. Professor POPE. Credit, four hours. Entrance credit, one unit (second unit).

Students will meet with First Year German class for work in grammar review and oral training. Reports on texts read outside of class will be presented at hours to be assigned.

Prerequisite: one year of high school German or its equivalent.

S 3. Third Year German. Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 177. Professor BOESCHE. Credit, four hours. Entrance credit, one unit (third unit).

Two recitations will be held daily except Saturday with a sufficient interval to enable the student to prepare for the second recitation.

Prerequisite: two years of high school German or its equivalent.

S 4. Advanced Composition and Conversation. Daily except Sat., 9. G. S. 190. Professor BOESCHE. Credit, two hours. This course will aim to train the students to write and to speak correct German. It will be conducted in German. Papers, based upon pictures and works of literature discussed orally in class, will be handed in regularly and corrected by the teacher. A few extra hours will be set aside for instruction in elementary phonetics.

S 5. Life and Works of Goethe. Daily except Sat., 10. G. S. 177. Professor POPE. Credit, two hours.

In 1919 the pre-Weimar period will be studied and Götz, Werther, and the earlier lyrics will be read. Students who have completed this course may elect Course 12 in the regular college year and receive credit for both courses.

FRENCH

S 1. Elementary Course. Daily except Sat., 8 and 12. G. S. 290. Credit, four hours. Mr. ROUX.

Entrance credit, one unit.

The object of this course is twofold: first, to give beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity of studying the methods of presentation of these subjects to beginners.

Texts: Fraser and Squair, Shorter French Course; Roux, Elementary French Reader.

S 2. Intermediate Course. Daily except Sat., 8 and 12. G. S. 221. Credit, four hours. Mr. JAGU.

Entrance credit, one unit.

S 3. Advanced Course. Daily except Sat., 8 and 12. G. S. 190. Credit, four hours. Assistant Professor SHANKS.

S 4. Advanced Translation. Daily except Sat., 9. G. S. 290. Credit, two hours. Mr. BUTTERY.

S 5. Elementary Composition and Conversation. Daily except Sat., 11. G. S. 290. Credit, two hours. Assistant Professor SHANKS.

S 6. History of French Literature. Daily except Sat., 10. G. S. 283. Credit, two hours. Professor VATTIER.

Lectures on French literature since the Middle Ages, with outside reading and reports. This course is given in French.

S 9. Literature of the Nineteenth Century. Daily except Sat., 11. G. S. 283. Credit, two hours. Professor MASON.

Lectures on French literature from 1850 to 1900, with outside reading and reports.

S 14. Advanced Composition and Conversation. Daily except Sat., 8. G. S. 283. Credit, two hours. Professor VATTIER.

This course is conducted in French.

S 16. French Phonetics. Daily except Sat., 9. G. S. 283. Credit, two hours. Professor MASON.

An introduction to the study of phonetics. Considerable attention is given to phonetic transcription and to the use of phonetics in the teaching of French.

S 17. Contemporary French Novel. Daily except Sat., 12. G. S. 283. Credit, two hours. Professor VATTIER.

Lectures on the contemporary novel, with outside reading and reports. This course is given in French.

S 18. Explications de Textes. Daily except Sat., 10. G. S. 183. Credit, two hours. Mr. JAGU.

A linguistic and literary study of selected passages from contemporary writers. This course is conducted in French.

S 26. Old French Texts. Daily except Sat., 11. Library, French Seminary Room. Credit, two hours. Professor HAMILTON.

A linguistic and literary study of selected old French texts.

S 30. The Teaching of French. Daily except Sat., 11. G. S. 190. Credit, two hours. Mr. ROUX.

A course for the discussion of the problems connected with the teaching of French in the secondary school. The course will consist of lectures, both in French and English, on topics of interest to teachers of French, and of a practical demonstration of the teaching of French in secondary schools. The course will be conducted in French as far as possible and there will be plenty of opportunity for the discussion of individual problems of teaching presented by members of the class.

French Readings. Mlle. Delattre will give readings in French daily except Saturday at 2.15 P. M. in the Drawing Room of Sage College or Prudence Risley Hall.

French Lectures. A series of lectures in French dealing with French national life will be given by the members of the instructing staff in French on Wednesday evenings at 8 P. M. in Goldwin Smith, Room 290.

La Maison Française. The Sill Cottage on the Campus has been reserved for students of French. Abundant opportunity for conversation in French will be afforded. Mlle. Delattre will be in charge of la Maison Française and also of a special table at Sage College where only French will be spoken.

ITALIAN

S 1. Grammar, Composition, and Translation. Daily except Sat., 8 and 12. Credit, four hours. G. S. 277. Professor HAMILTON.

The object of this course is to give the student a working knowledge of the language, so that he will be able to write simple Italian, and translate Italian prose and selected pieces of the best of Italian poetry.

S 2. Introduction to Italian Literature. Lectures and Readings. T and Th., 9. Credit, one hour. G. S. 177. Professor HAMILTON.

This course will consist of lectures on the beginnings of Italian literature, through the Renaissance, with extensive supplementary readings in selected texts, and in the literary and historical criticism of the period.

SPANISH

S 1. Elementary Course. Daily except S., 8 and 12. G. S. 242. Credit, four hours. Assistant Professor STURGIS.

Entrance credit, one unit.

S 2. Intermediate Course. Daily except S., 8 and 12. G. S. 281. Credit, four hours. Mr. SHERWELL.

Entrance credit, one unit.

S 3. Advanced Course. Daily except S., 8 and 12. G. S. 124. Credit, four hours. Mr. RIVERA.

Entrance credit, one unit.

S 5. Elementary Composition and Conversation. Daily except S., 11. G. S. 281. Credit, two hours. Mr. SHERWELL.

S 7. Advanced Composition and Conversation. Daily except S., 11. G. S. 277. Credit, two hours. Mr. RIVERA.

Special attention will be given to free composition and correspondence. The course will be conducted in Spanish.

S 10. Masterpieces of Spanish Literature. Daily except S., 9. G. S. 277. Credit, two hours. Assistant Professor KENISTON.

A brief survey of Spanish literature through a study of representative works. Lectures, outside reading, reports, and discussions.

S 30. The Teaching of Spanish. Daily except S., 10. G. S. 281. Credit, two hours. Assistant Professor KENISTON.

A course for the discussion of methods in the presentation of Spanish in secondary schools. Special attention will be given to phonetics, the choice and use of texts, class room methods, and auxiliary material.

Spanish Lectures and Readings. A series of lectures and readings in Spanish by members of the instructing staff will be given during the session.

La Casa Española. A section in Prudence Risley Hall has been reserved for students of Spanish, and there will be a special table at which only Spanish is spoken. The group will be in charge of Señorita Manosalva and there will be ample opportunity for Spanish conversation.

ENGLISH

Courses S 1 and S 2 taken together will be considered the equivalent of the first term of course 1 or of course 3 in the regular University session. Courses S 1 and S 11 taken together will be considered the equivalent of the second term of course 1 or of course 3. But courses S 1, S 2, and S 11 taken together will not be considered the equivalent of both terms of course 1 or of course 3.

Courses in brackets are not given in the summer of 1919, but may be expected in the summer of 1920.

S 1. Composition. Daily except Sat., 8. G. S. 156. Credit, two hours. Mr. BUNDY.

A practical drill intended for those who lack proficiency in writing; discussion of the elements and forms of discourse; frequent exercises, mainly expository; weekly personal conferences at hours to be appointed.

S 2. Introductory Course in Literature. Daily except Sat., 9. G. S. 164. Credit, two hours. Mr. BUNDY.

Primarily a study of five of the Idylls of the King: the Coming of Arthur, Lancelot and Elaine, the Holy Grail, Guinevere, and the Passing of Arthur; and of the first, fifth, sixth, and seventh books of the Ring and the Book; and supplementary reading in Tennyson and Browning.

S 4. Advanced Composition. Daily except Sat., 11. G. S. 164. Credit, two hours. Professor STRUNK.

The planning, writing, and criticism of essays and of other exercises in composition, accompanied by a study of general principles of writing and of questions of English usage. The work of the class will be supplemented by personal conferences. 'Open only to students who have had course S 1 or its equivalent.

S 5. Teachers' Course. Daily except Sat., 10. G. S. 156. Credit, two hours. Assistant Professor NORTHUP.

Lectures, readings, reports, and discussions. Designed for those who are teaching or who expect to teach English in schools. The organization of the high school course in English; methods of treating the works named by the Conference on Uniform Entrance Requirements in English; the teaching of literature in general; supplementary reading for pupils and teacher; the use of the school library and the public library; stage productions; the place of language and grammar in the high school; problems of oral and written composition; the relation of composition to literature and to other subjects in the curriculum.

[S 6. Nineteenth Century Poetry. Daily except Sat., 8. G. S. 164. Credit, two hours.

A study of the important poems of Wordsworth and Coleridge and of the Romantic movement in English poetry.]

S 7. Nineteenth Century Poetry. Daily except Sat., 8. G. S. 164. Credit, two hours. Assistant Professor BROUGHTON.

A study and discussion of the most important poems of Byron, Shelley, and Keats; brief survey of the literary and historical background of the period; significant revolutions in thought, in literary criticism, and in the art of poetry

[S 8. **Nineteenth Century Prose.** Daily except Sat., 9. G. S. 160. Credit, two hours.

A study of some significant examples of modern prose, drawn chiefly from Macaulay, Carlyle, Lamb, and DeQuincey. There will be some discussion of prose style and of the essay as a literary type.]

S 9. **The English Drama.** Daily except Sat., 9. G. S. 160. Credit, two hours. Assistant Professor ADAMS.

An historical survey of the English drama from its origin to the close of the Elizabethan period, with a reading of typical plays.

S 10. **Shakespeare.** Daily except Sat., 11. G. S. 156. Credit, two hours. Assistant Professor ADAMS.

A study of a few of the greater tragedies with stress upon the dramatic art of Shakespeare.

S 11. **American Literature.** Daily except Sat., 12. G. S. 156. Credit, two hours. Assistant Professor BROUGHTON.

A study of the American poets of the nineteenth century with particular attention to Bryant, Poe, Whittier, Longfellow, Lowell, Holmes, and Emerson. Text: Page, *Chief American Poets*.

S 12. **Victorian Literature.** Daily except Sat., 12. G. S. 164. Credit, two hours. Assistant Professor NORTHUP.

Lectures, readings, reports, and discussions of the leading characteristics and literary tendencies of the nineteenth century; the Romantic movement; the literary reflection of social changes; the relation of science and politics to literature; the development of the various types of literature; illustrative readings in the works of Tennyson, Browning, Arnold, Swinburne, Morris, Rossetti, Dickens, and Thackeray, with a glance at some other writers.

This course does not cover the ground of course S 2.

[S 13. **The English Novel.** Daily except Sat., 12. G. S. 164. Credit, two hours.

A brief historical survey of the novel in English is followed by detailed study and discussion of the novelists of the nineteenth century. This course may serviceably supplement course S 12.]

S 14. **Modern Drama.** Daily, except Sat., 10. G. S. 160. Credit, two hours. Professor STRUNK.

An advanced course designed for those who have completed two or more college courses in English, or whose reading serves as an equivalent for freshman and sophomore work.

Reading and discussion of characteristic plays of some of the more important, recent dramatists—Ibsen, Strindberg, Björnson, Tchekov, Shaw, Galsworthy, and others; consideration of the modern theatre; current theories of drama.

Texts: the first plays read will be Ibsen, *The Master Builder*, etc. (Modern Library, vol. 1), and Strindberg, *Plays, Second Series* (Scribner's). As an entirely different set of plays will be read, this course may be taken by those who took S 11 in the Summer Session of 1918.

[S 15. **Dramatic Structure.** Daily except Sat., 12. G. S. 156. Credit, two hours.

A study of the principles of dramatic construction, based upon Greek, Elizabethan, and classical French drama. Reading of a large number of representative plays.]

S 16. **The English Language.** Daily except Sat., 9. G. S. 162. Credit, two hours. Assistant Professor MONROE.

A study of essential features in the growth and development of the mother-tongue. Among the topics considered are: language and grammar in general; some misconceptions about the life of language; the relationships of English; phonetics, with practical exercises; the English vocabulary; inflections; native resources and foreign influences; modern English grammar; syntax; disputed usages; the bearing of historical grammar on present forms and usages, spoken and written.

Recitations, lectures, collateral reading. The course does not require previous knowledge of Old or Middle English.

[S 17. **Recent English Poetry.** Daily except Sat., 11. G. S. 160. Credit, two hours.

A study of the poetical work of Robert Bridges (the classical tradition of English poetry), Rudyard Kipling (the romance of the modern world; imperialism), and W. B. Yeats (neo-romanticism; the Celtic revival); readings from other contemporary work, including the "new poetry" and the poetry of the War.

Texts: Robert Bridges, *Poetical Works* (one volume, Oxford edition); Kipling, *Collected Verse*; Yeats, *Poetical Works*, vol. i.]

S 18. **Old English.** Daily except Sat., 11. G. S. 162. Credit, two hours. Assistant Professor MONROE.

This course is intended for students who, lacking the opportunity hitherto, now wish by earnest effort to acquire some knowledge of English in its early form. Lessons in grammar are followed as soon as possible by the reading of easy prose of the time of Alfred the Great.

The course may be taken by undergraduates; and, with additional reading, by graduates as a part of their work for the master's degree. The time of meeting may be changed to suit the convenience of the class.

Problems and Methods in Research. For graduates only. Hours and place to be arranged. Assistant Professor ADAMS.

During the present session this course will deal with the recent discoveries in the bibliography of Shakespeare's folios and quartos, and the application of these discoveries to the play of Hamlet.

Middle English Literature. For graduates only. Hours and room to be arranged. Assistant Professor NORTHUP.

A study of some of the leading tendencies in late Middle English literature. The special topic for this session will be the life and works of John Lydgate.

Wordsworth. For graduates only. A study of his writings with reference to his ideals of liberty and international relations. G. S. 159, at hours to be arranged. Conferences and reports. Duration, six weeks. Professor STRUNK.

PUBLIC SPEAKING—ORAL ENGLISH

In the courses described below, individual instruction will be given by appointment. In this way the particular needs of each student can be met. No fees will be charged for this special instruction.

S 1a. Public Speaking. Daily except Sat., 9. G. S. 21. Credit, two hours. Assistant Professor DRUMMOND.

A practical training for speaking in public. Original speeches and selections; extemporaneous speeches. Methods of preparing will be discussed and illustrated. High school teachers will find the methods applicable to their work. Regular students passing this course will be admitted to the work of the second term in Public Speaking, course 1.

S 1b. Public Speaking. Daily except Sat., 9. G. S. 24. Credit, two hours. Assistant Professor HUNT.

A continuation of course 1a.

S 2. Voice Training. Daily except Sat., 10. G. S. 21. Credit, one hour. Special work may be arranged with the instructor for two hours additional credit. Assistant Professor MUCHMORE.

This course consists of exercises for the development of pure tone, flexibility, melody and strength of voice, clear enunciation, and for relief from high, strained tones, harshness, throatiness, and speakers' sore-throat. Private appointments will be given each student, in which the voice will be tested, and, if needed, special exercises prescribed. The course necessarily includes training for poise and ease of action. The relation of the voice in conversation, teaching, and public speaking to health is emphasized.

S 3. Oral English in the High School. Daily except Sat., 8. G. S. 26. Credit, two hours. Assistant Professor HUNT and Miss YEOMANS.

The aim in this course is to cover the work outlined in the New York State Syllabus, except as this work is provided for in the other courses. Special attention to argument and discussion.

S 4. Oral Reading. Daily except Sat., 12. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE and Miss YEOMANS.

This course is designed especially to help teachers of literature, but is open to all students. The first part of the course will be devoted to the elements of reading: attention, individualization, and sequence of ideas. The second part will be given to the oral interpretation of literature, with special emphasis on the spirit rather than the form. Each member of the class will receive private appointments, and will prepare individually at least one selection. Regular students who pass this course will be admitted to the second term in Oral Reading, course 10.

S 5. The Production of School Plays. Daily except Sat., 11. G. S. 26. Credit, two hours. Consent of instructor necessary for admission. Assistant Professor DRUMMOND and Miss YEOMANS.

The course is intended to give teachers sufficient knowledge of play-production to meet the growing demand in the schools for dramatics that have an educational value. There will be consideration of choice of plays, elements of training, staging of plays, and other practical phases of production. Reading of plays

to insure sufficient familiarity with suitable dramatic literature will be required. One act plays will be rehearsed.

PHILOSOPHY

The courses in philosophy are intended to be of general, rather than of technical interest, and may be taken by all students. Candidates for the degree of Master of Arts who have chosen philosophy as a major or minor subject will find it profitable to take at least some of these courses as a basis and preparation for more advanced study. Such students will be given personal guidance in regard to their reading.

S 1. Logic. Daily except Sat., 8. G. S. 225. Professor CREIGHTON.

An introductory course in deductive and inductive logic, including practice in the analysis of logical arguments and in the detection of fallacies.

S 2. History and Philosophy of the Fine Arts. Daily except Sat., 10. G. S. 225. Professor HAMMOND.

An introduction to the philosophy of aesthetics in conjunction with an outline of the history of the plastic and graphic arts.

S 3. Individual and Social Ethics. Daily except Sat., 11. G. S. 225. Professor THILLY.

The aim of this course is to study the principles of human conduct and its relations to society and the State.

S 4. Greek Philosophy. Daily except Sat., 12. G. S. 227. Professor HAMMOND.

History of the Greek systems of Philosophy and their survival in the Roman Empire and Christian civilization. Particular attention will be given to the political, aesthetic, and moral ideals of the Greeks as expressed in their life and literature.

S 5. The Development of Modern Philosophical Thought. Daily except Sat., 9. G. S. 225. Professor THILLY.

This is a course in the history of modern philosophy, covering the same ground as that given during the second term of the regular year. It will, however, be somewhat less technical than that course, and will emphasize the connection of philosophy during the modern period with literary, scientific, political, and social movements.

S 6. The Development of Contemporary Philosophical Problems. Daily except Sat., 12. G. S. 225. Professor CREIGHTON.

A survey of the philosophical systems of the nineteenth century for the purpose of relating them to the thought of the present time, followed by an examination of certain contemporary points of view in philosophy, such as idealism, realism, and pragmatism.

PSYCHOLOGY

S 1. Psychology. Lectures: M T W Th, 9, Professor TITCHENER. Recitations: F, 8 and 9, Assistant Professor WELD, Dr. BOCK, and Mr. SHEPPARD. G. S. Room C. Credit, two hours.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a "scientific" psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life as indicated by experiment, beginning with sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall.

Textbook: Titchener, Textbook of Psychology.

S 2. Problems and Points of View in Psychology. Daily except Sat., 11. G. S. Room C. Credit, two hours. Assistant Professor WELD.

A course of lectures with supplementary readings dealing with other phases of psychology than that of the normal human adult individual. Special attention will be given to physiological and animal psychology, to the psychology of the abnormal individual, of the child, and of individual differences.

S 4. Qualitative Laboratory. M W F, 2.00-4.30. Psychological Laboratory, Morrill Hall. Credit, two hours. Assistant Professor WELD, Dr. BOCK, and Mr. SHEPPARD.

The purpose of this course is to furnish the student training in psychological method, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark rooms, workshops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student may carry out experiments upon the more complex processes of association and action. The textbook is Titchener's Experimental Psychology, vol. i, Qualitative Student's Manual.

S 5. Quantitative Laboratory. M W F, 2.00-4.30. Psychological Laboratory, Morrill Hall. Credit, two hours. Assistant Professor WELD, Dr. BOCK, and Mr. SHEPPARD.

This course aims to furnish such training in the psychophysical methods and in the handling of instruments of precision as will be adequate preparation for research problems. The student will make experimental determinations of the stimulus limens, will attempt verifications of Weber's Law in various departments of sense, and will perform at least one experiment by each one of the chief psychophysical methods. Quantitative experiments in special fields may be undertaken in so far as time permits. The textbook is Titchener's Experimental Psychology, vol. ii, Quantitative Student's Manual.

Laboratory partnerships must be formed if the work of this course is to be pursued with profit. If, therefore, a partner cannot be found, the student is recommended to register in course S 6.

S 6. Advanced Work in Psychology. Psychological Laboratory, Morrill Hall. Hours and credit to be arranged. Assistant Professor WELD, Dr. BOCK, and Mr. SHEPPARD.

As a prerequisite for this course, Course S 4, or its equivalent, is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice at a higher level than that of course S 4.

Professor TITCHENER will be in residence for the eight weeks from June 30 to August 22, to direct the work of candidates for the degree of Ph.D. in Psychology.

EDUCATION

Courses S 1, S 2, and S 3, will be found especially helpful to college graduates who are preparing for examinations in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Education Department will hold an official examination for such candidates at Ithaca, August 14 and 15. Since it is permissible to do so, those who can should prepare for examination in two subjects this summer and for the remaining two a year later.

S 1. Educational Psychology. Daily except Sat., 10. G. S. 256. Credit, two hours. Assistant Professor FOSTER.

A study of the learning process and its application to educational theory and practice: the original nature of man, reflex action and instinct; the acquisition of habits; attention, memory, association and thinking; fatigue, individual differences and social cooperation. The textbook used in this course will be Colvin's Learning Process.

S 2. Principles of Education. Daily except Sat., 11. G. S. 256. Credit, two hours. Professor OGDEN.

The nature and significance of education; biological and psychological foundations; the school as a social institution; educational ideals and values; the curriculum, administration and general methods. The textbook used in this course will be Ruediger's Principles of Education.

S 3. History of Education. Lectures, recitations, and prescribed readings. Daily, except Sat., 9. G. S. 256. Credit, two hours. Mr. HOISINGTON.

The purpose of this course is to give an understanding of present educational values and practices through an historical consideration of their origin and development. Throughout the course, therefore, attempt will be made not only to outline the problems and their solutions, but to correlate education with the life and the social, psychological, and economic conditions of the times. Only such theories and practices as later proved themselves influential will be considered.

The topics treated are to a great extent those emphasized in the syllabus for the New York State Teacher's Certificate: education in primitive and barbaric societies; Greek and Roman education; the rise of the school as an institution; scholasticism, humanism, and realism; the rise of science; the 'psychological' movement; the origin and nature of specifically modern tendencies in education.

Textbook: Graves, Student's History of Education.

S 7. Mental Tests. Lectures, readings, and laboratory. Lectures, M W F, 12; G. S. 256, Laboratory, T Th, 2-4.30. Credit, two hours. Assistant Professor FOSTER and Mr. HOISINGTON.

A general consideration of the psychology and the practice of mental tests. The lectures will deal with the historical development of tests, the principles underlying their formation and application; the single tests and the test-systems; the bearing of tests upon the problems of psychological theory (nature and distribution of intelligence, the correlation of abilities, etc.); the use of tests in the schools, and for the diagnosis of insanity, defective and exceptional abilities, the selection of a vocation, educational measurement, and the like.

The laboratory work is intended to give practice in the administering of tests both to individuals and to groups. The principal single tests as well as the recognized series-tests will be used. The results of the laboratory testing will serve as the basis for a part of the lecture course.

Textbook: Terman, The Measurement of Intelligence.

S 8. Advanced Work in Education. Hours and credit to be arranged. G. S. 248. Professor OGDEN, Assistant Professor FOSTER, and Mr. HOISINGTON.

As a prerequisite for this course one of the courses S 2, S 3, or S 7, or an equivalent, is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice of an advanced grade. A seminary will be given if application is made by a sufficient number of advanced students.

TRAINING COURSE FOR PSYCHOLOGICAL EXAMINERS

By recent legislative enactment of the State of New York, special classes for defective children must be formed whenever ten or more such cases are found in any school district. A similar law is operative in New Jersey, and like requirements are being made in other states. Not only is there a considerable consequent demand for teachers trained in the examination and instruction of defectives, but with the increasing recognition of the extent and importance of individual differences in endowment, there is increasing recognition of the usefulness of familiarity with the methods and interpretation of psychological examinations not only for the mentally backward and subnormal, but also for the normal and supernormal, and in other fields than that of education.

To assist in meeting these various needs, the departments of Education and Psychology call special attention to courses in Introductory, Experimental, and Educational Psychology, and to the course in Mental Tests. The latter has been expanded to give a thorough training in administration of tests and evaluation of results. Students who wish to enter this course with a view to educational and other field service, are advised to register for such additional courses in Psychology as may be helpful in providing an adequate understanding of psychological principles and methods of investigation. Advice in the selection of courses with regard to the individual needs of the student may be had by consulting Professor R. M. Ogden, Goldwin Smith Hall 246, either in person or by letter.

HISTORY

S 1. Greek and Roman History. Daily except Sat., 11. G. S. Room A. Professor NATHANIEL SCHMIDT.

A survey of the history of the Greeks from the earliest times to Augustus, and of the Romans to the fall of the Empire. Lectures, collateral reading, and examinations.

S 2. Oriental History. Daily except Sat., 12. G. S. Room A. Professor NATHANIEL SCHMIDT.

A survey of the history of the ancient Egyptian, Babylonian, Syrian, Medo-Persian, Hittite, and Aryan civilizations. Lectures, collateral reading, and examinations. This course will cover the ground of the first term's work in Ancient History, 1918-1919.

S 3. Modern European History. Daily except Sat., 9. G. S. 234. Credit, two hours. Professor B. E. SCHMITT.

An outline of the general history of Europe since about 1500. The emphasis will be upon political history, international relations, and colonial expansion, but social and economic problems will be treated as far as time permits. The relation of the more remote periods to the war of 1914 will be constantly kept in mind.

S 4. Historical Background of the War of 1914. Daily except Sat., 11. G. S. 234. Credit, two hours. Professor B. E. SCHMITT.

A study of the principal events and forces leading up to the war, more especially of the period since 1870. Particular attention will be paid to problems of nationality in Eastern Europe. The negotiations preceding the outbreak of the war will be studied from the original documents.

S 5. English History to 1485. Daily except Sat., 9. G. S. 242. Credit, two hours. Assistant Professor SWEET.

A survey of the political, constitutional, economic, and social development of the country from the days of the Roman occupation to the accession of the Tudor dynasty. The lectures treat of Roman Britain; the barbarian invasions and the development of an Anglo-Saxon civilization; the introduction of Christianity; the social and legal effects of the Norman Conquest; feudalism; the foundation of the English constitution; the mediaeval church, its growth in power and its conflicts with secular authority; life in town and country; the development of representative institutions; the rise of the middle class; the growth of commerce and industry; the close of the middle ages.

S 6. English History since 1815. Daily except Sat., 10. G. S. 242. Credit, two hours. Assistant Professor SWEET.

A survey of the salient features of the political, constitutional, economic, and social development of England and the British empire. The lectures deal with the social and industrial legislation; parliamentary reforms; economic development; the conflict of parties and the growth of liberalism in England; the expansion of the empire; economic and political development in the over-seas dominions; imperial conferences; the Irish question; foreign policy and international relations to the outbreak of the war with Germany.

S 7. American History, 1815-1850. Daily except Sat., 8. G. S. 234. Credit, two hours. Professor BRETZ.

A general treatment of the period indicated above, with the emphasis upon expansion and upon the social conditions resulting from the occupation of the Mississippi Valley. Attention will be paid to the development of political parties and party practices. The work will consist of lectures, discussions, and reference readings.

S 8. American History, 1865-1914. Daily except Sat., 10. G. S. 234. Credit, two hours. Professor BRETZ.

This course treats briefly the period of the Civil War and Reconstruction and emphasizes the subsequent period of industrial growth and territorial expansion. Special attention is devoted to the changes effected by the war in political theory and in constitutional development. Other matters considered are the Spanish-American War and the problems arising from our insular possessions, the new nationalism, and the extension of popular government.

American History. Seminary. Sat., 9-11. For students qualified for research. Consult Professor BRETZ. G. S. 235.

[**American History.** The expansion of the American people, 1750-1850, with special reference to the founding of new states in the Mississippi Valley and the social and political conditions arising from the westward movement of population.] Not given in 1919.

American History, 1850-1875. The Period of Civil War and Reconstruction. The final phase of the slavery controversy, the governmental and military problems of the Civil War, and the reconstruction measures.] Not given in 1919

GOVERNMENT AND SOCIAL SCIENCE

S 1. American Government. Daily except Sat., 9. G. S. 227. Credit, two hours. Professor GETTELL.

The organization and activities of the government of the United States, including the federal, commonwealth, local, and municipal systems. Attention is also given to the government of our dependencies and to the position of the United States in foreign affairs. This course is intended especially for teachers of Civics.

S 2. Social and Political Institutions. Daily except Sat., 10. G. S. 227. Credit, two hours. Professor GETTELL.

A study of the nature and evolution of the most important social and political groupings and of their activities and interrelations. Especial attention is given to the family, the church, the industrial, commercial, and labor institutions, and to the state. The relation of state to individual, and of state to state, in both theory and practice is given consideration, and the proper scope of state activities is discussed.

ECONOMICS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general

economics; (2) students with special interests in economic subjects; (3) students seeking broad preparation for the teaching of economics in secondary schools. For the first group, Course S 1 covers the subject matter usually included under elementary economics. For Cornell students Course S 1 substitutes for both terms of Economics 52 and will also serve in lieu of Course 51 as a prerequisite to admission to various advanced courses in Economics. Graduate students wishing to pursue special investigations will be afforded assistance by members of the Summer Session staff of instruction, and by other members of the Department of Political Science of the University who may be in residence in Ithaca during the summer.

S 1. Principles of Economics. Twice daily except Sat., 10 and 11. G. S. 264. Credit, four hours. Professor DAVENPORT.

A general introduction to economics, covering the fundamental principles of value and the distribution of wealth, together with the elements of money and banking.

S 2. Money and Credit. Daily except Sat., 8. G. S. 236. Credit, two hours. Assistant Professor REED.

A study of the principles governing the mechanism of exchange: how the general level of prices is determined; effects of a changing price level upon investment operations; foreign and domestic exchange; the history of bimetallism in the United States; the present status of the gold standard; recent tendencies toward inflation.

It is recommended, but not required, that Theory and History of Banking be taken in connection with this course.

S 3. Theory and History of Banking. Daily except Sat., 12. G. S. 236. Credit, two hours. Assistant Professor REED.

The work of the commercial bank; national and state banking systems; the Central Banks of Europe; development and work of the American Federal Reserve System; the money market and organized speculation; financial readjustments occasioned by the European war.

This course and Money and Credit covers the field usually surveyed in college courses in Money and Banking. If possible, students in Theory and History of Banking should also take Money and Credit.

S 4. Corporation Finance. Daily except Sat., 10. G. S. 236. Credit, two hours. Assistant Professor REED.

A study of the organization, administration, and regulation of corporations. Particular attention will be paid to the financial aspects of the subject.

S 5. Elements of Accounting. Daily except Sat., 9. G. S. 236. Credit, two hours. Professor ENGLISH.

The theory of debit and credit in double entry bookkeeping; the classification of accounts; the construction and use of a simple accounting system; the preparation and interpretation of financial statements.

S 6. Principles of Accounting. Daily except Sat., 8. G. S. 256. Credit, two hours. Professor ENGLISH.

A study of accounting systems, including a discussion of the issue of stocks and bonds and of the problems connected with the valuation of assets.

S 7. General Problems of Industrial History. Daily except Sat., 9. G. S. 264. Credit, two hours. Assistant Professor USHER.

Prerequisite, course S 1, previously or concurrently. The course may also be taken by students who have had courses in English history.

For undergraduates and graduates; special attention will be given to graduate students.

Stages of industrial development; the craft guilds of the middle ages; the rise of capitalism; development of the factory system; problems of the wage-earning class. The emphasis will be laid primarily upon the Industrial Revolution.

S 8. Social Problems in England in the Nineteenth Century. Daily except Sat., 11. G. S. 236. Credit, two hours. Assistant Professor USHER.

Prerequisite, course S 1, previously or concurrently; or courses in English history.

The land and the aristocracy. General theories of legislation and reform. Utilitarianism, the police power, socialism. The poor laws. Sanitation, housing, and factory legislation. The Liberal Party and its policies.

For undergraduates and graduates; special attention will be given to graduate students.

MATHEMATICS

In addition to the courses noted below, each teacher will have a daily office hour for consultation with students. It is urged that this opportunity be utilized by all concerned.

In the following list, courses S 1 to S 5 (2) are the equivalent to those having the same number in the Announcement of the College of Arts and Sciences for 1918-1919.

Courses S 1, S 2, S 3 are planned for those teachers in the secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations) and of plane geometry. University credit for S 1, S 2, S 3, three hours each.

S 1. Solid Geometry. Daily, 11. White 24. Professor SNYDER. (Office hour, 10, White 26.)

S 2. Advanced Algebra. Daily, 9. White 1. Assistant Professor GILLESPIE. (Office hour, 10, White 3). White 21, Assistant Professor CARVER. (Office hour 11, White 22).

S 3. Trigonometry. Daily 10. White 21. Assistant Professor CARVER. (Office hour, 11, White 22).

Students taking S 5 (1) or S 5 (2) are requested to take no other University work during the session without special permission.

University credit for S 5 (1), S 5 (2), six hours each.

S 5 (1). Analytic Geometry and the Calculus. (First term's work). Daily, 8 and 11. White 25. Professor HUTCHINSON. (Office hour, 9, White 26).

S 5 (2). **Analytic Geometry and the Calculus.** (Second term's work). Daily, 8 and 11. White 6. Assistant Professor HURWITZ. (Office hour, 9, White 8).

S 6. **Advanced Geometry.** Daily, 9. White 24. Credit, two hours. Professor SNYDER. (Office hour, 10, White 26).

Various topics in projective and analytic geometry will be developed.

S 7. **Advanced Calculus.** Daily, 11. White 1. Credit, two hours. Assistant Professor GILLESPIE. (Office hour, 10, White 3).

The time will be spent in a study of the processes of the calculus and their applications. It will be assumed that the students have had an elementary course in analytic geometry and calculus. Beyond this the course will be planned as far as possible to meet the preparation and needs of the members of the class.

S 41 (c). **Differential Equations.** Daily, 9. White 2. Credit, two hours. Dr. H. B. OWENS. (Office hour, 10, White 4).

This is a continuation of the Course in Differential Equations which started at the beginning of the second term, December 30, 1918, and will complete the course.

S 42 (c). **Advanced Calculus.** Daily, 10. White 2. Credit, two hours. Assistant Professor OWENS. (Office hour, 9, White 4).

This is a continuation and completion of the course in Advanced Calculus that started December 30, 1918.

For students of the eight weeks' term in the Technical Colleges.

S 5 (c). **Integral Calculus.** Daily. Credit, five hours. Six sections, 8, 11. Assistant Professor SHARPE. (Office hour, 9, White 29).
Assistant Professor CRAIG. (Office hour, 10, White 4).
Assistant Professor OWENS. (Office hour, 9, White 4).

Students of the Summer Session who enroll for the eight weeks' course must pay a supplemental tuition fee of \$5.

S 80. **Topics in Mathematical Physics.** Daily, 9. White 6. Assistant Professor HURWITZ.

Prerequisite, Mathematics 42 or its equivalent. Credit, three hours. The topics to be treated will be selected in conformity with the interests of members of the class.

In addition to the courses of advanced character announced in the preceding list, others will be given, if sufficient demand arises. Provision will be made to permit of any carefully planned program of study or research, either by means of formal courses, or by supervised reading and discussion. Members of the Department, both of the six- and of the eight-week terms, will extend all possible aid to students in planning and carrying out such programs.

PHYSICS

Teachers may enter any course that they are prepared to pursue with profit and are entirely at liberty to take portions of courses if such an arrangement is to their advantage.

COURSES IN INTRODUCTORY AND GENERAL PHYSICS

Those who have not had college physics are advised to take course S 2b.

S 2b. Introductory Experimental Physics. Credit, three hours. This course is identical with Physics 2b as given during the past winter quarter and deals with the topics of Heat and Electricity. Teachers and others familiar with the elements of the subject may find the course useful and suggestive.

Lectures: The lectures are accompanied by experimental demonstrations for which the equipment is unusually complete. Daily except Sat., 8. Rockefeller A. Professor GIBBS.

Laboratory: Two 2-hour laboratory periods a week. T Th, 9-11 or 11-1; W F, 9-11 or 11-1. Assistant Professor HOWE and Mr. COLLINS.

S 2c. Problems. This course is identical with 2c given during the past spring quarter and is exclusively for students in engineering.

It will continue throughout the eight weeks of the Summer Term of the engineering colleges. Three hours a week as assigned. Mr. ———.

S 4b. General Physics: Recitations. Properties of matter, sound, and light. The work in this course will presuppose a knowledge of introductory physics such as may be obtained in a first course in college physics. Daily except Sat., 12. Rockefeller 105. Credit, two hours. Professor GIBBS.

S 9. General Physics. Recitations. Theory and problems covering electrostatics, the electric current, and electro-magnetics. Physics S 9 constitutes half of a course in general physics and follows more or less closely the subject matter given in the corresponding course of the regular academic year. It is recommended that the corresponding part of Physics S 12 or S 14 be taken simultaneously with Physics S 9. Prerequisites, Physics 2 or its equivalent and the differential and integral calculus. Daily except Sat., 9. Rockefeller 105. Credit, two hours. Assistant Professor BIDWELL.

S 10. Physical Experiments. This course may with profit be taken by teachers of elementary physics who wish to acquire a teaching familiarity with introductory laboratory work, and by those students who have had Physics 2 or the equivalent.

The experiments offered include studies in units, statics, kinetics, properties of matter, light, sound, electricity, and magnetism. The fundamental physical laws and constants are studied, partly from the qualitative, partly from the quantitative point of view.

The work may be varied to suit the needs of the student, since the instruction is in all cases individual.

Credit, one or two hours. Two three-hour periods a week, as arranged, for each credit hour. Daily except Sat., 10-1. Rockefeller 205. Assistant Professor HOWE and Mr. COLLINS.

S 12. Physical Measurements. Primarily for teachers and students who wish a thorough introduction to the theory and methods of physical measurements and observations either as a preparation for graduate study or as an extension of previous work in Physics. The methods of setting up and adjusting apparatus, the study of sources of error and their elimination, methods of computing and

arranging data, the interpretation of results, both analytically and graphically, are given special emphasis.

The experiments offered comprise such subjects as force, work, power, efficiency of machines, linear and angular motions, moment of inertia, elasticity, vapor tension, a study of the analytical balance; velocity of sound in air and in metals, wave motion, vibration of strings and wires under tension; study of lenses and mirrors with special attention to the use of the spectrometer and the diffraction grating in measuring wave lengths of light and indices of refraction; photometry; in electricity and magnetism a special series of experiments is offered intended to give a thorough grounding in electrical measurements and at the same time to bring out the relations of the several electrical units to the fundamental units of mass, length, and time.

The instruction is individual and the topics covered may be adjusted to meet the needs of the student. Credit, one to four hours. Prerequisites: the equivalent of eight hours of college Physics (unless Physics S 9 be taken simultaneously) and a knowledge of the elements of the calculus. One to five two and one-half hour periods each week. M W F, 10-12.30 (or 9-11.30 by special arrangement) and T Th, 2-4.30. Rockefeller 252. Assistant Professor BIDWELL and Mr. MERTZ.

S 14 Physical Measurements. Physics 14 will be given in the Summer of 1919 as an eight weeks' course for students in engineering. One two and a half hour period each week. Hours as in Physics S 12. Rockefeller 252. Assistant Professor BIDWELL and Mr. MERTZ.

S 17. Teachers' Course. The work in this course will include a discussion of the choice, arrangement, and presentation of the subject matter of physics in high schools and the selection of experiments suitable for demonstration and laboratory work.

Three meetings a week for conferences, discussions, and experimentation, as arranged. Credit, one hour. Professor GIBBS and Assistant Professor HOWE.

INTERMEDIATE COURSES

Each of the following courses, S 20a to S 23b, is substantially equivalent to half of the corresponding course as given during the college year. The division is made in such a way that the student may take either half of one of the topics without the other. The intention is to complete this sequence of courses once in four summer sessions. The courses that may be expected in the summer sessions of the years 1919-1922 are indicated below:

1919	S 22a and S 21b
1920	S 22b and S 20a
1921	S 23a and S 20b
1922	S 23b and S 21a

In general a student to profit by these courses should have completed the equivalent of Physics 2 and 4 of the college year, and elementary calculus. He should moreover have had laboratory work in physics and if this is not the equivalent of Physics 12, he should elect Physics S 12 in addition. A student who contemplates electing any of these courses is advised to correspond with the department about his preparation for the work.

Courses S 20a to S 23b and Course S 25 may be taken for credit toward a master's degree in physics, subject to the requirements of the graduate school. (See Announcement of the Graduate School). It is recommended that students taking any of the courses S 20a to S 23b supplement the work by some work in course S 25.

[S 20a. **Heat.** Thermometry, expansion, equations of state, thermal conduction, and change of state.] Not given in 1919.

[S 20b. **Heat.** An elementary study of the kinetic theory of gases and thermodynamics and the laws of thermal radiation.] Not given in 1919.

[S 21a. **Light.** Geometrical optics.] Not given in 1919.

S 21b. **Light.** Physical optics, including a study of the wave theory of light, particularly with reference to interference, diffraction and polarization phenomena, radiation, absorption, and dispersion. Daily except Sat., 12. Rockefeller C. Mr. MURDOCK.

S 22a. **Electricity and Magnetism.** A study of electric and magnetic fields, Kirchhoff's laws, direct current phenomena including methods of measurement, the theories of gaseous, electrolytic, and metallic conduction and chemical and thermal electromotive forces. Daily except Sat., 8. Rockefeller C. Mr. MURDOCK.

[S 22b. **Electricity and Magnetism.** Electromagnetism, alternating current phenomena, and electrical oscillations.] Not given in 1919.

[S 23a. **Properties of Matter.** Gravitation and a short study of the dynamics of solids.] Not given in 1919.

[S 23b. **Properties of Matter.** Elasticity, surface tension, dynamics of fluids, and viscosity.] Not given in 1919.

S 25. **Advanced Laboratory Practice.** This course is open to students who have had Physics 12 or its equivalent. It is intended to meet the requirements of the following students: those desiring to continue their laboratory work in general physics by putting more time on individual problems than is advisable in Physics 12; those who wish to take up special topics for detailed study; those taking courses S 21b or S 22a and desiring to supplement the work in the laboratory; and those preparing to take up research who wish to develop their laboratory technique. Credit varies with the amount of work done. The laboratory will be open daily except Saturday, 9-12. Rockefeller 301. Mr. MURDOCK.

S 34. **Electrical Laboratory.** Experimental study of direct and alternating current apparatus. The character of the work will be varied to meet individual needs. Prerequisite, Course 12 or its equivalent. Laboratory will be open daily except Sat., 8-12. Credit varies with amount of work done. Rockefeller 158. Mr. MERTZ.

ADVANCED COURSES

Course S 40 is designed to give a fairly comprehensive study of special topics in modern physics. The subject matter of this course is changed from year to year.

Courses S 46, S 51, and S 52 are intended to meet the needs of students who desire in a brief period to make an intensive study of the more important and fundamental fields of theoretical physics. It may be expected that one of these courses will be offered each summer.

Subject to the requirements of the graduate school (See Announcement of the Graduate School and special pamphlet regarding opportunities for graduate work in the summer) these advanced courses may be taken for credit toward a doctor's degree in physics.

S 40. Modern Developments in Physics. In the summer of 1919 this course will deal principally with the phenomena and underlying principles of electromagnetic waves and oscillations, with frequent reference to the use of such waves in radio telegraphy. Experimental lectures and laboratory. Students may take the lectures without the laboratory. Daily except Sat., as arranged. Rockefeller B. Professor MERRITT.

[S 46. Theoretical Physics. Optics.] Not given in 1919.

S 51. Theoretical Physics. Mechanics. Lectures and problems. Daily except Sat., as arranged. Rockefeller B. Professor MERRITT.

[S 52. Theoretical Physics. Electricity and Magnetism.] Not given in 1919.

S 75. Special Topics for Investigation. Students who are prepared to profit by the use of the library and laboratory facilities of the department in the study of some special topic or in investigation will be given an opportunity to do so. This work may be taken in connection with or independently of any of the above courses and will be under the direction of one or more members of the staff with whom frequent conferences should be arranged. Credit varies with the nature and amount of work done.

For further information regarding opportunities for research and investigation during the Summer of 1919 see special pamphlet of the Graduate School.

CHEMISTRY

The courses announced below correspond entirely or in part with courses given during the regular sessions of the University. For regular students the requirements for admission to the various courses will be the same as during the year.

Teachers may be admitted to any course for which their general training or experience may be considered to prepare them. Every effort will be made to meet the individual needs of teachers by arranging and modifying the work as far as possible so as to fulfil the particular requirements in each case.

S 1. Introductory Inorganic Chemistry. a. Lectures daily except Sat., 12, Rockefeller. Professor BROWNE and Mr. GRIFFIN. The lectures deal with the fundamental theories and laws of chemistry and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experi-

mental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

b. Laboratory work, M W, 8-12, and T Th F, 9-12. Morse Hall. Dr. FOGLESONG and Mr. COLONY. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course especial attention will be given to the methods of laboratory instruction, qualitative experiments, and the blowing of simple glass apparatus.

c. Recitations. T Th F, 8. Morse D. Dr. FOGLESONG. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory; thorough drill in the solution of chemical problems.

Credit for a, b, and c, six hours.

S 6. Elementary Qualitative and Quantitative Analysis. This course is divided into two parts, either of which may be taken without the other. Credit, two, three, or five hours.

A. Qualitative Analysis. Lectures, M W F, 11, Morse C; Laboratory, daily except Sat., 1.30-4.30. Mr. RIDER and Mr. LOUDER. Credit, three hours. An elementary course for those who have had the equivalent of course S 1. A study in laboratory and class room of the methods for detecting and separating the principal bases and inorganic acids. This is followed by the analysis of various substances, either in solution or in solid form, the composition of which is unknown to the students. Considerable emphasis is laid upon the writing of equations expressing the reactions involved in the work.

B. Quantitative Analysis. Elementary. Lectures, T Th, 11. Morse C. Laboratory, M W F, 8-11. Credit, two hours. Mr. RIDER and Mr. LOUDER.

An introduction to quantitative methods and the chemistry upon which these methods are based. Lectures, explanatory of the methods used, are first given; each student then performs simple analyses which involve the use of apparatus ordinarily employed in analytical work.

Advanced work (see course S 14) may be taken by students who complete this course before the close of the session.

S 7. Qualitative Analysis. Lectures and recitations, daily except Sat., 8. Rockefeller 109. Laboratory, daily except Sat., 1.30-4.30, and M W F, 9-12. Mr. RIDER and Mr. LOUDER. Credit, one to six hours.

This course comprises (1) a study in class room and laboratory of the methods for detecting each of the important acids in the presence of the others, together with the reactions involved, followed by the analysis of more complex mixtures than those assigned in course S 6A; and (2) a comparative study in the laboratory of different methods of detecting and separating the bases.

S 12. Quantitative Analysis. Lectures, daily except Sat., 8. Morse C. Laboratory, daily except Sat., 9-1. Mr. NICHOLS and Mr. BRANDES. Credit, four, five, or six hours.

A longer elementary course in which extended practice in volumetric and gravimetric analysis is offered.

S 14. Quantitative Analysis, Advanced Course. Laboratory practice at hours to be arranged. Credit one, two, three, or four hours. Mr. NICHOLS and Mr. BRANDES.

This course comprises instruction in certain gravimetric and volumetric methods of analysis and in the methods of combustion analysis. The work includes the analysis of iron ores, iron and steel, slags, coal and coke, cements and cement materials, alloys, ores of copper, lead, zinc, mercury, manganese, tin, etc.

S 16. Electrochemical Analysis. Laboratory practice at hours to be arranged. Credit, one hour. Mr. NICHOLS and Mr. BRANDES.

A study of the most approved electrochemical methods for the determination of silver, lead, copper, tin, nickel, cobalt, and zinc. Practice will be given in the analysis of alloys and ores.

S 19. Qualitative and Quantitative Gas Analysis. Lectures, daily except Sat., 12. Morse 119. Credit, two hours. Mr. WYCKOFF.

A discussion of the apparatus and methods employed (a) in the examination of the important industrial gases, (b) in the determination of the heating value of fuels, and (c) in gas evolution experiments. Problems are assigned which afford practice in the calculation and interpretation of results.

S 20. Technical Gas Analysis. Laboratory. Open to those who have taken or are taking Course S 19. Credit, two hours. Mr. WYCKOFF and Mr. ———.

The analysis of gas mixtures with various forms of apparatus, the complete analysis of flue gas, coal gas, Pintsch gas, Blau gas, natural gas, producer gas, acetylene, and air; the determination of the heating power of gaseous, liquid, and solid fuels; the analysis of various substances by gas analytical methods involving the use of the different types of gas evolution apparatus. Within certain limits the work may be selected to suit the requirements of the individual student.

S 24. Opticochemical Methods. Lectures, daily except Sat., 11. Morse 119. Laboratory practice at hours to be arranged. Credit, three hours. Mr. WYCKOFF and Mr. ———.

The lectures deal with the construction and with the use in chemical analysis of the spectroscope, polariscope, refractometer, colorimeter, spectrophotometer, and nephelometer. The laboratory instruction is devoted to practice in the proper use of these various instruments.

S 25. Opticochemical Methods. Advanced Course. Laboratory. Credit, one or more hours. Mr. WYCKOFF.

Advanced work in the application of the methods of spectroscopy to qualitative and quantitative analysis. The work may be varied to meet the needs of the student.

S 30. Organic Chemistry.

A. Aliphatic compounds. Lectures and recitations. Daily, 8. Morse 119. Laboratory practice at hours to be arranged. Credit, four to six hours. Professor ORNDORFF, Mr. JACKSON, and Mr. CORNWELL.

B. Aromatic compounds. Lectures and recitations. Daily, 11. Rockefeller. Laboratory practice at hours to be arranged. Credit, four to six hours. Mr. JACKSON and Mr. BEDIENT.

This course presupposes a knowledge of elementary chemistry. Part B must be preceded or accompanied by Part A. The two parts of the course may be taken together or Part A may be taken one summer and Part B the following summer.

B'. Aromatic compounds. Lectures and recitations. Daily, 12. Rockefeller. Laboratory practice, M T W Th F, 1-5.30, S, 8-12.30. Credit, four hours. Mr. JACKSON and Mr. BEDIENT.

This course is for students who began Course 30 B on December 31, 1918, and is a continuation of Course 30 B. It is open to other students by special permission.

S 31. Organic Chemistry.

A. Aliphatic compounds. Lectures and recitations. Daily, 8. Morse 119. Credit, three hours. Professor ORNDORFF and Mr. CORNWELL.

B. Aromatic compounds. Lectures and recitations. Daily except Sat., 11. Rockefeller. Credit, three hours. Mr. JACKSON and Mr. BEDIENT.

These lectures and recitations are the same as those of Course S 30. Course S 30 should be taken in preference to Course S 31 whenever it is possible.

S 32. Organic Chemistry, Shorter Course. Aliphatic and aromatic compounds. Lectures and recitations. Daily, 8. Morse 119; daily, 11, Rockefeller, during the first three weeks of the session, and 8, only, during the remainder of the session. Laboratory practice at hours to be arranged. Credit, four hours. Professor ORNDORFF, Mr. JACKSON, and Messrs. CORNWELL and BEDIENT.

The lectures and recitations of this course include all of those of Course S 30 A, and the first half of those of Course S 30 B. Course S 32 presupposes a knowledge of elementary chemistry, and is designed more particularly for students registered in the Colleges of Medicine and Agriculture.

S 33. Special Chapters in Organic Chemistry. Lectures and recitations. T Th, 10, Morse 119. Credit, one or two hours. Professor ORNDORFF and Mr. CORNWELL.

This course is for students who began Course 33 December 31, 1918, and who wish to complete the course. It is open to others by special permission.

S 34. Advanced Organic Chemistry. Laboratory practice at hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Mr. JACKSON, and Mr. CORNWELL.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult, and requiring more skill and experience on the part of the student.

S 37. Methods of Organic Analysis. Laboratory practice with occasional lectures. Hours to be arranged. Credit, two or more hours. Professor ORNDORFF, Mr. JACKSON, and Mr. BEDIENT.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin oils, etc.

S 48. Selected Topics in Advanced Inorganic Chemistry. Lectures, M W F, 10. Rockefeller. Credit, one hour. Professor BROWNE.

The hydronitrogens and their derivatives will be discussed during the summer session of 1919. The course is intended for graduate students and seniors in chemistry, but is open to others by special permission.

S 50. Introductory Physical Chemistry.

A. Lectures daily, 8, Rockefeller. Credit, three hours. Assistant Professor BRIGGS and Messrs. HOEL and MCKINNEY. A systematic presentation of modern chemical theory. The subject matter includes: an historical review of chemical theory up to 1800; atomic and molecular theory; gases, liquids, and solids; the theory of solution; colloid chemistry and adsorption; reaction velocity, catalysis, and equilibrium in homogeneous systems; application of physico-chemical principles to actual practice.

[B. Lectures daily except Sat. Credit, three hours. A continuation of Part A. The subject matter includes the phase rule and its applications; thermo-chemistry; electrochemistry; photochemistry; application of the principles of physical chemistry to actual practice.] Not given in 1919.

B. Lectures: M T W Th, 12. Rockefeller. Credit, three hours. Assistant Professor BRIGGS and Messrs. HOEL and MCKINNEY. This course is a continuation of Course 50 B and is intended primarily for those who began Course 50 B on December 31, 1918. Open to others only by special permission. The course will probably include thermo-chemistry, photochemistry, and elementary electro-chemistry.

S 51. Physical Chemistry Laboratory. A. Laboratory practice daily except Sat., 9-1. Credit, three hours. Assistant Professor BRIGGS and Messrs. HOEL and MCKINNEY. Open to those only who have taken or are taking Course 50 A or its equivalent. With the data obtained in the laboratory as a basis, detailed reports are written covering each of the following topics: calibration of volume-measuring apparatus; molecular weight determination by vapor density; boiling point, and freezing point methods; vapor pressure; viscosity; distillation of liquid mixtures.

[B. Laboratory practice, daily except Sat., 9-1. Credit, three hours. Assistant Professor BRIGGS and Mr. ———. Open to those only who have taken or are taking Course 50 B or its equivalent. The course is a continuation of Part A. The following topics are considered: dissociation; solubility; reactions; reaction velocity and catalysis; indicators; thermochemistry; diffusion; colloids and adsorption; photochemical reactions; phase rule studies of inversion points, solid-liquid; liquid-liquid; compounds.] Not given in 1919.

B'. Laboratory practice, M T W Th, 8-12. Morse. Credit, three hours. Assistant Professor BRIGGS and Messrs. HOEL and MCKINNEY. This course is a continuation of Course 51 B and is intended primarily for those who began Course 51 B on December 31, 1918. Open to others only by special permission.

S 54. Colloid Chemistry. Credit, two hours. Lectures, M W F. Morse 119. Assistant Professor BRIGGS and Messrs. HOEL and MCKINNEY. This course presupposes a working knowledge of elementary inorganic, organic, and physical chemistry. Topics: Adsorption, general theory of colloid chemistry, classification of colloidal systems; preparation and properties of typical colloidal systems, application of principles of colloid chemistry to technical processes and everyday life.

S 57. Laboratory Practice in Physical Chemistry. Credit, one to three hours. Laboratory periods to be arranged. Assistant Professor BRIGGS and Messrs. HOEL and MCKINNEY.

This course is designed to afford opportunity for special laboratory practice in physical chemistry, colloid chemistry, or electrochemistry.

S 65. Chemical Microscopy, Elementary. Lectures, demonstrations, and laboratory practice at hours to be arranged. Credit, two hours. Professor CHAMOT and Miss WRIGHT. The use of the microscope and its accessories; microscopic methods as applied to chemical investigation. The examination of crystalline compounds, recognition of textile fibres, paper-making fibres, etc. The application of microscopic methods to quantitative analysis, and in metallurgical industries. The laboratory will be open daily except Sat., 8.30 to 1.

S 66. Chemical Microscopy, Advanced. Laboratory practice at hours to be arranged. Credit, three hours. Professor CHAMOT and Miss WRIGHT. Practice in the examination and analysis of inorganic substances containing the common elements and acids, with reference to rapid qualitative methods and the analysis of minute amounts of materials. The laboratory will be open daily except Sat., 8.30 a. m. to 1 p. m.

S 96. Research. Credit, one to six hours. Senior chemists, and others by special permission, may elect research under the direction of some member of the staff of instruction.

For courses in agricultural chemistry see pages 60, 61, of this announcement.

ZOOLOGY AND ORNITHOLOGY

S 1. General Zoology. Lectures, daily except Sat., 9. McGraw 5. Laboratory, daily except Sat., 2-5.30. McGraw 2a. Credit, six hours. Assistant Professors REED and SHADLE.

A general survey of the animal kingdom, the life processes, adaptations, reaction to environmental stimuli, the relations of animals, and the principles of zoology. Observations upon living animals both in the laboratory and in nature will constitute a portion of the course. An example of each animal group will be studied as a part of the laboratory work. This course is the equivalent of course 1, given during the academic year.

Laboratory fee, \$6.

S 2. Teachers' Course. This course is adapted to the needs of those who are teaching or preparing to teach zoology and presupposes a training equivalent to that given in course S 1. The work includes the study of various forms of animals not included in general courses and instruction in the collection and preparation of material for class use. Opportunity will be given for learning the fundamental principles of making permanent preparations of class material.

The laboratory work will be supplemented by field work in which attention is given to the natural habitat of animals and methods of collecting and preserving them for future use.

Hours to be arranged. Credit, one or more hours. Assistant Professors REED and SHADLE.

Petrunkévitch's *Morphology of Invertebrate Types*, Macmillan & Co., and Guyer's *Animal Micrology*, Chicago University Press, will be found very valuable as reference books for this work. Laboratory fee, \$3.

S 3. Comparative Anatomy of Vertebrates. Daily except Sat., 2-5.30. McGraw 3. Credit, three hours. Assistant Professor REED and Mr. GAMBLE.

A thorough study of the various systems of organs with a view to gaining a better understanding of the structure of man and other mammals. The laboratory work is supplemented by lectures and recitations.

Laboratory fee, \$6.

S 4. Ornithology. Credit, three hours. Lectures, M W, 11. McGraw 5. Laboratory, M W, 2-5. Field work, T Th, 5.30-8 a. m. Laboratory fee, \$1.50. Assistant Professor ALLEN and Mr. LEISTER.

A course designed to give an introduction to the study of birds and a knowledge of the common species. The lectures will discuss such subjects as classification, migration, coloration, song, nest building, eggs, care of young, methods of attracting birds, economic importance, etc. The laboratory practice with bird skins will give an intimate knowledge of all the common birds of Eastern North America and familiarity with the use of a manual. The aim of the field work is the identification of birds in their haunts and observations upon their habits. Each student should be provided with Chapman's Handbook of Birds of Eastern North America and with field or opera glasses.

S 5. Economic Ornithology and Mammalogy. Credit, two hours. Should be preceded or accompanied by course S 4; presupposes elementary knowledge of botany and entomology. Lectures, T Th, 11. McGraw 5. Laboratory and field work, T Th, 2-5. Assistant Professor ALLEN and Mr. LEISTER.

This course is designed to assist those planning professional work with birds or mammals. The lectures will take up the various phases of bird and mammal life in relation to agriculture with the methods of increasing beneficial species and destroying vermin; together with the elements of game breeding and fur farming. The laboratory will give practice in the identification of game birds, vermin, the food of birds; in the preparation of material and the making of skins. The field work will give opportunity for observation of feeding habits, field collecting, methods of attracting birds, and natural history photography.

HUMAN PHYSIOLOGY

S 1. Elementary Human Physiology. Daily except Sat., 12. Stimson Hall Amphitheatre. Credit, two hours. Professor SIMPSON. Lectures and recitations. For all University students interested in biology.

S 2. Laboratory Exercises in Physiology. M Th, 2-5; T F, 2-4. Stimson Hall. Credit, two hours. Mr. BURLAGE and Mr. DYE.

This may be taken by the members of Course S 1 or by any student who has had previous instruction in the theory of science. The simple fundamental experiments on which modern physiology is built will be carried out in the laboratory by the students themselves under the direction of the instructors.

GEOGRAPHY AND GEOLOGY

Illustrated Special Announcement. A special announcement with many photographic illustrations showing typical features of the Cornell environment and

the work of excursion classes in the field is published for the department and may be had post-free on application to the Secretary of the Summer Session. The text of this special announcement is devoted largely to an explanation of the advantages of the Cornell region for outdoor study of both geography and geology. As the special announcement was issued in 1914, it should be noted that there are changes in the courses as listed in the following paragraphs for 1919. Note also that auto trucks are now used instead of wagons.

Equipment and Purpose. The lecture rooms and laboratories are in McGraw Hall. It is the purpose in this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical and industrial geography, and in the elements of geology; also educational methods in geography.

The environs of Cornell University are rich in phenomena of geographic and geologic interest. Field excursions, consequently, are made an especially important part of the work of this department in the Summer Session.

The laboratories are well equipped with apparatus and illustrative material for instruction. This material includes teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

For entrance credit ($\frac{1}{2}$ unit) in physical geography, a student is required to attend, complete all required work, and pass the examinations in courses S 1, S 8, and S 10.

LECTURE COURSES IN GEOGRAPHY AND GEOLOGY

S 1. Physical Geography. M T W Th, 9. Physical Geography Laboratory, second floor, south end, McGraw Hall. Assistant Professor VON ENGELN. Credit, two hours.

An introductory course in physical geography covering most of the subjects treated in the modern texts, but touching more fully on the general concepts and the theoretical side of the subject than is possible in high school work. Some of the topics treated are the general form of the earth, origin and distribution of relief features, processes and progress of the physiographic cycle and the resultant development of land forms, configuration of the ocean basins, nature and effects of the continental glaciation, and the bearing of these various phenomena on life relationships.

The lectures in physical geography are fully illustrated by lantern slides, wall and globe maps. Readings will be assigned in Tarr and Martin's *College Physiography*. Students registering in this course are advised to take also the related courses S8 and S10, and if possible S 5.

S 2. Commercial and Industrial Geography. M T W Th, 11. Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

The course will consist of lectures, text readings, and special topics for individual study and report. Consideration will be given such topics as: Geographic

factors influencing the development and expansion of commerce and industry; routes and nature of trade, ancient and modern; natural resources in their relation to industry; utilization of tropical lands; geography of cities; localization of industry. The course should be helpful to teachers of regional geography in the grade schools as well as to teachers of commercial and industrial geography in high schools.

S 3. Methods of Teaching Geography in Elementary Schools. T W Th F, 8. Geological Lecture Room. Credit, two hours. Professor HUBBARD.

Methods of teaching Regional Geography will be made the basic subject of study in the course. Among the topics considered will be: Division of continents into regional units, rational basis for such division, outstanding features of each region, causal relations: with practice in the use and interpretation of maps of surface, weather charts, etc. Choice of textbooks, use of outline maps, purpose of field work, etc., will be discussed. Plans for overcoming the special difficulties in teaching the various topics of mathematical geography; latitude and longitude, rotation, seasons, standard time, etc., will be offered. The Problem-Project method of teaching geography will be studied in connection with assignments of different projects to students for solution.

S 5. Geology. A General Introductory Course. M T W Th, 10. Geological Lecture Room. Professor RIES. Credit, two hours.

Among the topics discussed are: origin of the earth; geological evolution of continents and ocean basins, the significance, areal distribution, and structural features of the great rock groups, as well as the forces modifying them; vulcanism, earthquakes, and similar phenomena.

The lectures will be illustrated with lantern slides, models, maps and specimens. Students registering for this course are urged to take the laboratory course S 9, and, if possible, course S 10.

S 31. Engineering Geology. Lectures, T Th, 9. Laboratory and recitation, T or Th, 2-4.30. Geological Lecture Room. Professor RIES and Mr ELSTON.

Continuation of regular session course 31. Not open to new students this term.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

S 8. Physical Geography, Laboratory Course. T Th, 2-4. Physical Geography Laboratories. Professor HUBBARD. Credit, one hour.

The members of this class will make a systematic study of the physiographic Regions of the United States using contour maps, models and the experimental laboratory of the department in a laboratory study of the subject. By such study of the topographic, regional, and life relationships (human, animal, and plant) the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish to obtain a broader basis for their work in the subject as well as for those who expect to teach geography in the high schools.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 9. Geology, Laboratory Course. W F, 2-4. General Geology Laboratory Credit, one hour. Mr. ELSTON.

This course is designed to supplement course S 5. A study will be made of the more common structural phenomena; of the interpretation and uses of geological maps; of characteristic life forms developed in different geologic periods; and of the more common rocks and minerals. Short field excursions will be made to collect both rock specimens and fossils.

A laboratory fee of \$1 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance.

S 10. Geography and Geology, Field Course. This course should be elected by all those registering in course S 1 or S 5 and is required of all those who desire entrance credit in physical geography. With courses S 1 and S 8 it affords a comprehensive course in physical geography; with courses S 5 and S 9 it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit.

Students not registered in the course or department are invited to attend these excursions but must conform to the directions of those in charge. Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1, 2, 3, 5, 6 are required of all students in the course, and in addition for one hour's credit they must make either 10, or two of 7, 8, and 11.

Meeting place and time announced in mimeographed outlines or by bulletin. Meet for first excursion, Monday, July 15, at Geological Lecture Room, McGraw Hall, 2.00 p. m. Excursions 1-6, Monday afternoons; 7, 8, 11, all day Saturday; 10 starts on Saturday. On the excursions to which a cost is attached persons wishing to go must register at the department and secure tickets in advance of the date of the trip.

The longer excursions will be under the general charge of Assistant Professor von Engeln with the co-operation and assistance of the other members of the instructing staff. On the excursions stops will be made at points of interest, explanations made, questions asked, and discussion invited.

OUTLINE OF EXCURSIONS—Course S 10

Monday Afternoons

1. **Eagle Hill.** To become acquainted with the lie of the land about Cornell, to learn the place names of the broader physiographic features, studying, enroute, processes of weathering, and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east, and west may be had. July 14.

2. **Fall Creek and Deadhead Hill.** To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition, and cementation. An intimate view of one of the large gorges and its especial features, particularly Ithaca Falls. July 21.

3. **Shore of Cayuga Lake.** To study shore line phenomena, joint planes, bedding, and stalactite formation. A walk for several miles along the east shore

of the Lake. Probably a return by trolley; if so, expense 15c to 20c may be paid at the time. July 28.

5. **Terminal Moraine. North Spencer.** By train or auto truck. Expense about \$1.25. To study a massive morainic loop, the basin in which the former ice tongue rested, and the outwash deposits and overflow channels to the south. Truncated valley sides due to glacial erosion. The most striking examples of glacial phenomena in the Cornell region. August 4.

6. **Six Mile Creek.** To study the effect of glaciation on a stream course. Relations to water supply and power development. A climb into and walk through one of the gorges in Six Mile Creek and an interpretation of its complicated physiographic history. August 11.

All-Day Excursions

7. **Taughannock Gorge and Falls.** By boat. Expense about 75c. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock. A sail along the west shore of the lake and a walk through the great gorge to Taughannock Falls, one of the highest straight falls east of the Rockies. Luncheon at the foot of the falls. July 19.

8. **Enfield Gorge and Falls; and Connecticut Hill.** By auto-truck. Expense about \$1.50. To study the relations of preglacial and hanging valleys and the postglacial and interglacial gorges, their origin and features. Joint plane guidance of stream courses. A ride to the head of the gorge, climb through it to the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell region. In the afternoon, a ride to the top of Connecticut Hill, the highest point in the region. July 26.

Longer Excursions

10. **Niagara Falls and Gorge.** By train and trolley cars, if railroad conditions permit; otherwise omitted in 1919. Expense between \$12 and \$15. Overnight at Niagara Falls. August 9.

All the important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory when the relations of the different places will be explained and illustrated by a large scale relief model of the Niagara region. Students are advised to send to Director U. S. Geological Survey, Washington, D. C., for a copy of Niagara Folio, No. 190, in octavo form; cost 50c in coin or money order.

11. **Watkins Glen.** By auto-truck. Expense about \$2. August 2.

Watkins Glen is considered one of the most beautiful scenic spots in the country. It has been secured for a state park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in detail; and consider its relations to the Seneca Lake valley in comparison with the conditions at Ithaca as related to the Cayuga valley. Ride across the dissected upland country to the south and west between Ithaca and Watkins.

PHYSICAL EDUCATION AND PHYSICAL TRAINING FOR WOMEN

The following courses of lectures are open to all students as far as their time and strength permit.

S 1. **Hygiene.** Dr. CLINTON P. McCORD.

S 20. **Physical Diagnosis.** Dr. CLINTON P. McCORD.

S 30. **First Aid.** CHARLES ETHAN ALLEN.

For details regarding these courses and others offered in Gymnastics and Playground Activities, see pp. 68-70. Students desiring to elect courses in Gymnastics and Playground Activities, courses which are offered by the Department of Physical Education in the College of Agriculture, should consult Mr. Laurence S. Hill, Caldwell Hall, Room 282.

S 5. **The Teaching of Rhythm, Singing Games, Elementary Folk and Aesthetic Dancing.**

For students taking this course for the first time. The first two or three weeks will be devoted to the Rhythms, Singing Games, and Folk-Dances; the last few weeks to Elementary Aesthetic Dancing. Daily except Saturday.

S 6. **Advanced Course in Rhythm, Singing Games, Folk-Dancing, and Aesthetic Dancing.**

Entirely different material from Course S 5. The first three weeks devoted to new singing games and folk-dances; the last three weeks to advanced aesthetic dancing. Daily except Saturday.

If any special class, not offered here, is desired, it may be arranged by consulting the department.

Students taking any of these courses should provide themselves with suitable costume—gymnasium shoes and bloomer-suits, or bloomers and middy-blouse, with black stockings.

Appointments will also be made for those desiring any corrective work, either for individual help, or as teachers.

S 7. **Swimming and Fencing.**

Instruction in swimming and life saving; and in fencing for individual training and for teaching will be given at hours to be arranged for each applicant by appointment.

For this instruction a special charge is made: for swimming, \$10; for fencing, \$5, including outfit.

Gymnasium costume and slippers (without heels) will be advisable for fencing.

For women, Sage College Gymnasium. 10-12 a. m., 3-6 p. m. For men, Armory Gymnasium, by appointment. Mr. GÉLAS.

DRAWING AND DESIGN

S 1. **Freehand Drawing for Elementary and Secondary Schools.** Daily except Sat., 9-12. Sibley 208. Mr. GRIFFITH.

A course to meet the needs of the school teacher. A complete course of study, in detail, from the first grade through the high school is first considered. Then each subject of that course is carefully developed and worked out. This will

include methods of drawing in such phases of the subject as the teacher must meet and in the common mediums such as pencil, water color, crayon, and charcoal. Theory and practice will be closely correlated. The study of design and color, perspective, and the pose, for their public school value, combined with talks on methods of presenting these subjects receive thorough attention. Sketching from nature, including out-of-door work for characteristic growth of trees, forms a part of the course. The relation of art to hand work is considered and the study of design is made applicable to constructive problems.

Although this course forms a complete unit in itself, the following course is designed as supplementary.

S 2. Design, Fine and Applied Art. Daily except Sat., 8-11. Sibley 202. Mr. GRIFFITH.

Open only to students who have completed course S 1 or its equivalent. Design is considered from a more advanced point of view and applied to color problems, book plates, title pages, constructive problems, printing, and the like. Stenciling and block printing on velvets and other textiles together with the introduction of interwoven silk on these textiles will be taught; also leather tooling and coloring of leather. Advanced out-of-door sketching will supplement that started in course S 1. Manuscript printing, done direct with quill or lettering pen, together with illumination, will be considered as outgrowths of the study of printing. Costume design and household decoration, as far as they are applicable to the grammar or the high school, will be considered in their application. Throughout the course illustrated lectures to develop art appreciation will be given. All subjects will be considered from the standpoint of both the secondary and the more advanced schools. A small laboratory fee (not to exceed two dollars) will be charged, to cover cost of material furnished.

Students who have completed courses S 1 and S 2 may continue their study, if so desired.

S 3. Mechanical Drawing for Secondary Schools. Sibley 102. Assistant Professor ———.

This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course.

S 4. Mechanical Drawing. M W F, 8-11, and daily except Sat., 2-5. Sibley 203. Assistant Professor ———.

A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, conventions, working drawings.

S 5. Machine Sketching and Drawing. M W F, 8-11, and daily except Sat., 2-5. Sibley 203.

A more advanced course in mechanical drawing for those who have the equivalent of course S 1. Sketching of machine parts, machine drawing from sketches, empirical design. This course is an application of the work in course S 1 to such machine designing as can be done without a knowledge of mechanics.

[S 6. **Descriptive Geometry.** Lectures, daily except Sat., 9. Recitations and drawing, daily except Sat., 10-12. Lincoln Hall. Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces. Tangencies. Intersections, shades and shadows, and perspective. The work is the same as that given in the regular C.E. course I, and the student will receive four hours credit if he takes the whole course. A three-hour course that does not include shades and shadows and perspective, and fulfills the requirements for the Mechanical Engineering students of Sibley College will also be given. The latter will be given from 2-5 p. m. if there are students enough to make up an extra section. The morning and afternoon sessions make it possible to readjust the above schedule so as to accommodate nearly all who may wish to take either course.] Not given in 1919, but see below.

MECHANICS OF ENGINEERING

[Textbooks: Church's Mechanics of Engineering, and Notes and Examples in Mechanics, supplemented by other printed notes and problems. Lincoln Hall, Assistant Professor RETTGER.

Course S 20 is the equivalent of M5 of Sibley College, or C.E. 20 of the College of Civil Engineering. Course S 21 is the equivalent of M6 of Sibley College, or C. E. 21 of the College of Civil Engineering.

S 20 includes Statics of a material point and of rigid bodies, and kinetics of rigid bodies.

Prerequisite, Integral Calculus.

S 21 includes strength of materials (that is, Mechanics of Materials).

Prerequisite, the equivalent of Course S 20).

A student taking either course for the first time is not permitted to take any other work unless permission to do so is granted him by the instructor in charge or by the class adviser of his college.

The courses are open to students from other universities subject to the same requirements for admission as made for Cornell students. Such students should bring with them official credentials from their universities showing that they satisfy the requirements for admission to the courses in question.] Not given in 1919, but see below.

COLLEGE OF CIVIL ENGINEERING

The courses mentioned above will not be offered as in previous Summer Sessions, but Descriptive Geometry, Mechanics of Engineering, Concrete Construction, Reinforced Concrete Arch Design, Bridge Stresses, Structural Design, Hydraulics, and several other courses will be offered during the summer of 1919 in the Summer Term of eight weeks in the College of Civil Engineering. These courses begin on the same date as do the courses in the Summer Session.

Subject to the approval of the administrative officers of the Summer Session and of the professor concerned, and upon payment of a supplemental tuition charge of \$5 for each course, students having the necessary prerequisites may be admitted to the courses offered in the College of Civil Engineering.

For special information, address the Dean of the College of Civil Engineering.

MUSIC

The courses offered by the Department of Music are primarily intended for the training of supervisors of music in the public schools, normal schools, and colleges. A special course is offered for the training of directors of instrumental music in the schools.

Students are admitted to the Department of Music only on application to Professor Hollis Dann. Conditions of admission, application blank, and other important information concerning the courses may be found in the special announcement of the Department, which will be sent on application.

Admission of students in other departments of the Summer Session cannot be promised in advance, and is possible only to such classes as are not filled by the students taking Music exclusively.

First year courses are designated A; Second year B; Third year C; Fourth year D; Advanced courses E.

Sight Reading—A. Daily except Sat., 12.00, (two sections). Miss BARTHOLOMEW and Miss OTTLEY.

In order to complete this course the student must be able to sing at sight individually, using the Latin syllables, music suitable for fourth year in the public schools.

Sight Reading—B. Daily except Sat., 10.10, (two sections). Mr. SCALES and Miss OTTLEY.

This course requires singing at sight individually, with and without syllables, music suitable for the first seven years in the public schools.

Sight Reading—C. M, 11.05, (two sections). Professor HOERRNER. T and Th, 12.00. Mr. SCALES.

Ability to read at sight, without accompaniment, with the Latin syllables or with words, such music as the Standard Oratorios, English Part-Songs, etc. A general review and individual singing of the sequential studies as found in *Manual for Teachers*, by Hollis Dann, is required of students passing this course upon entrance.

Proficiency in sight singing is of great advantage to the student entering the Supervisor's Course. Skill may be acquired through home study. New students are urged to make preparation to pass one or more of the sight reading courses upon entrance, thereby conserving time and strength for other studies which cannot be pursued successfully at home.

Dictation—A. Daily except Sat., 9.15 (two sections), Miss BARTHOLOMEW and Miss OTTLEY.

Study of tone and rhythm. The subject matter of music is presented first to the sense of hearing. In this course the student gains the power to think tones and to sense rhythms and learns to recognize and write simple melodic phrases in all keys.

Each student is required to complete the oral and written dictation work of the first four years in music as outlined in the *Complete Manual for Teachers*, by Hollis Dann, including singing from memory all sequential studies.

Dictation—B. Daily except Sat., 9.15, (two sections). Credit, two hours. Professor HOERRNER and Miss WHITE.

This course deals with the problems of tone and rhythm included in the fifth, sixth, and seventh years.

Each student is required to complete the oral and written dictation, including all sequential studies, as outlined for the fifth, sixth, and seventh years in *Complete Manual for Teachers*.

Dictation—C. Daily except Sat. 9.15 (two sections). Credit, two hours. Miss WISENALL and Professor BALLARD.

Open to students who have completed Harmony B.

This course includes melodic dictation selected from the Supplementary Material in the *Complete Manual for Teachers*, pages 188 to 209. It will also include harmonic dictation in two and three parts; aural recognition of intervals and chords in fundamental and inverted positions in major and minor tonalities.

University credit, two hours.

These courses in ear training, together with the courses in sight reading, harmony, and melody, give to the student a mastery of the elementary subject matter of music and constitute the fundamental training which is essential for advanced study.

The superiority of the best European schools of music over most American schools is largely due to the thorough three-year course in sight singing and dictation which is required of every student. The student in harmony and counterpoint hears and visualizes the chord and the melody before he writes them; the orchestral player hears the tones and feels the rhythm of a difficult passage before he plays it; the singer likewise acquires the musicianship which is evidenced by his ability to read and write the language.

The power to read and write a language with facility is a prerequisite to any advanced study of its literature. This is as true of Music as it is of English or of French. The proper place for this fundamental training is in the elementary and secondary schools.

Material and Methods—B. Daily except Sat., 11.05, Miss BRYANT.

This course is devoted to the study and demonstration of material and methods for the kindergarten and first four years in music. Special attention is given to the selection, presentation, and interpretation of rote songs, the presentation of the different tonal and rhythmic problems as they are taken up in successive years, the selection and use of material for the different grades, etc.

Material and Methods—C. Daily except Sat., 10.10, Professor DANN.

This course is open to students who have completed Material and Methods B, and is devoted to the teaching and supervising of Music in the upper grades, from the fifth to the eighth, inclusive. The work of each year is taken up in detail and the problems which confront the grade teacher and supervisor are carefully considered.

On Friday of each week at 10.00, the lesson in methods will consist of a demonstration with a class of children from the Ithaca public schools, a different grade each week. The entire department attends this demonstration. All will thus observe the practical application of methods to classes of children representing the several grades in the public schools.

High and Normal School Music—D. Daily except Fri. and Sat., 12:00, Professor DANN.

This is an advanced course to which only fourth year and more advanced students are admitted. The many difficult situations always present in the high and normal schools are carefully studied.

Some of the topics for special consideration are: the school chorus, glee clubs, classification of voices, grading and classification of high school students in music, bibliography of choral music suitable for high and normal schools, preparation for teaching in normal and training schools, elective courses, credits for the study of music both in and outside of the high school, etc.

Practice Teaching—C. Daily except Mon. and Sat., 11:05, Miss WHITE.

Each student will do practice teaching in the model school under the supervision of the instructor. (See Practice Teaching—D).

Additional hours will be arranged for individual and group conferences with the instructor.

Practice Teaching—D. Daily except Sat., 9:15, Miss BRYANT.

Open to fourth year students only. This course provides practical use of materials for all grades, and application of methods of teaching.

Each student will be given frequent opportunity for practice teaching under the supervision of the instructor. A model school consisting of a class of thirty-five children will be in attendance daily (a different grade each week) in order that the practice teaching and observation work may be carried on under actual school-room conditions.

No student can complete the course for supervisors until he is able to demonstrate his mastery of the subject matter and methods by actual teaching. It is highly important that each student shall have had some experience in teaching in the public schools before entering this class. **Previous experience in class teaching is invaluable and almost indispensable.**

Rudiments of Music.—Daily except Wed. and Sat., 2:15, Mr. SCALES.

This course provides instruction in the elements of music. The following are taken up for study: clefs, signification and origin; construction of major scale (without key-signature); normal, harmonic, and melodic minor scales; notation of chromatic scale with each key-signature; intervals and triads and their inversions.

New students are strongly advised to review thoroughly the subject matter of this course. Each should strive to acquire:

Facility in writing major, minor, and chromatic scales in all keys, with and without signatures, using both G and F clefs; ability to recognize and name intervals and triads and their inversions; the habit of thinking scale tones and triads by number names (beginning the minor with 1, the same as the major).

Harmony—A. Daily except Sat., 10:10, Miss WISENALL.

Admission to this course requires a working knowledge of rudiments of music. Harmony A includes a review of major and minor scales, tetrachords and key signatures, technical names of scale tones (tonic, dominant, etc.); the study of intervals, analysis and location of triads, connection of triads for four voices in

major and minor, authentic and plagal cadences; triad inversion. Text: Tapper, *First Year Harmony*.

Harmony—B. Daily except Sat., 12:00. Credit, two hours. Miss WISENALL and Professor BALLARD.

Dominant seventh chord and its inversions; deceptive cadence; secondary seventh chords and their resolutions; suspension, altered chords; open harmony with primary triads. Texts: Tapper, *First Year Harmony* and *Second Year Harmony*.

Melody—C. M W F, 12:00. Credit, one hour. Mr. JOHNSTONE.

The principles of melody construction. Normal rhythms and voice progressions. Melody-writing, step-wise and with simple skips. The harmonic basis of melody. The phrase; the period.

Melody—D. M W F, 11:05. Credit, one hour. Mr. JOHNSTONE.

Melody-writing in major and minor with special reference to harmonic suggestion. Rhythmic variety; essentials of good melody; unity of text and music in rhythm and in emotional content. Melody-writing in two parts. Simple accompaniments.

Chorus—A and B. Daily except Sat., 8:05. Mr. CAREY.

Study and interpretation of music suitable for the grade and junior high school; sight singing in parts; positions; breathing; enunciation; attack; formation of habits essential to a good chorister.

Advanced Chorus. Daily except Sat., 8:05. Professor DANN.

Open to all C and D students, and to A and B students who can qualify. Topics for special consideration are: position, breathing, tone production, vowel study, interpretation, and the preparation and performance of choral music. Cantatas and choruses suitable for high and normal schools will be sung by the chorus at the concerts given by the Department of Music. This work is an important part of the training in Choral Conducting. Mr. BRAUN, accompanist.

Choral Conducting—D. Daily except Fri. and Sat., 10:10. (two sections). Professor HOERRNER and Mr. BRAUN.

Open to fourth year students only. The routine and technic of choral conducting. Principal text, *Junior Songs* by Hollis Dann. Each member of the class, after passing an individual test, will conduct choral selections assigned by the instructor. At the final examination, each student will conduct five compositions from *Junior Songs* selected at random by the examiners.

Home study prior to the opening of the session is advised. The tempo of every selection in *Junior Songs* is indicated by a metronome mark. A metronome is a necessity for every student of conducting. Each member of the class is advised to purchase one. (Oliver Ditson & Co., Boston and New York, will send a No. 5 Metronome, postage prepaid, for \$4). Each student should strive to learn to beat or count 60 to the minute, without the assistance of the metronome. Both 60 and 120 to the minute are then "committed to memory," and form an excellent basis for judging other tempos. Individual and group lessons. Mr. CAREY.

Orchestral Conducting—D. Two sections—M, 2:15, Mr. MATTERN. Th, 2:15, Mr. MATTERN.

Open to D students only. Orchestras from the Ithaca schools will be in attendance. Members of this class are required to attend at least three rehearsals of the Community Orchestra.

School Orchestra—C. M T, 3:05, Mr. MATTERN.

Orchestras from the Ithaca grade schools and one from the Ithaca High School will be in attendance. A large repertoire of music suitable for school orchestras has been collected for the benefit of the members of the class.

Violin Classes.—(Elective.) Hours to be arranged. Mr. MATTERN.

The Violin Classes, including classes for beginners, are open to all students taking the course for supervisors. These classes form an important and valuable supplement to the courses in School Orchestra and Orchestral Conducting. Each member of the class should bring a violin if possible. Actual work with the violin is an excellent way to acquire efficiency in dealing with many of the problems of the school orchestra.

Community Orchestra. (Elective.) M, 7:30 p. m. Mr. MATTERN.

Open to music students and to students in all other departments of the Summer Session who can play any instrument of the symphony orchestra sufficiently well to be of assistance in ensemble playing.

Orchestra, Material and Methods—E. Daily except Sat., 11:05. Mr. MATTERN.

Open to students taking the course for Supervisors of Instrumental Music. A specialized and detailed study of the problems connected with the organization and training of beginners in instrumental classes preparatory to the school orchestra. Actual playing and marking of supplementary violin studies and grammar and high school orchestra music, illustrating bowing, fingering, phrasing, and tonal balance. Each student will be given the advantage of as much experience as possible in conducting the violin classes and school orchestras and will be required to play in the Summer Session Orchestra.

An entrance test in violin playing is required of students taking this course.

Orchestration—E. (Elective.) M W F, 10:10. Mr. JOHNSTONE.

Open to students who have a fair working knowledge of Harmony and have completed Melody D. Reading and playing from score. The full orchestra; the small orchestra. The incomplete orchestra; ways and means for supplying substitutes for the more unusual instruments (oboe, bassoon, French horn). Arrangement for orchestra from piano score.

Band and Orchestra Technique—(Elective). Daily, except Sat., 12:00. Mr. HERRICK.

Open to advanced students who have completed Harmony D. Required only of students who are preparing to become directors of instrumental music in the public schools. Study of band and orchestral instruments separately and in combination. Class instruction will be supplemented by individual assistance enabling the student to become acquainted with the compass, fingering, and other details of the several instruments. A complete set of instruments will be provided for demonstration purposes.

Class hours and hours for individual instruction are to be arranged with the instructor who will devote a large part of his time to members of this class.

Song Interpretation. T F, 2:15. Mr. JOHNSTONE.

(To be taken with Rote Songs and Voice Training B or C). A series of demonstrations open to B and C classes. Tempo, dynamics, phrasing, enunciation, and other elements that enter into the artistic rendition of songs. Study of selected rote songs.

Rote Songs and Voice Training—B or C. M Th, 2:15. Miss BRYANT.

(To be taken with the course in Song Interpretation). Topics: posture, breathing, principle of relaxation, tone quality, methods of presenting rote songs, care and training of the child voice, singing of rote songs. Each member of the class will be required to present a rote song.

Voice Training—D. T Th, 11:05, F, 12:00. Mrs. HUNT.

Open to D and more advanced students only. Class lecture-lessons. Individual and class instruction and demonstration. The foundation of singing; breath control; free vocal emission and aural appreciation; phrasing, accent, rhythm, and enunciation in artistic rendition; all leading to a strong vocalized declamation without unnecessary effort or complication.

Additional hours with small groups by appointment.

Principles and Practice of Teaching—D. This is a home-study course. The textbook is *How to Teach* by George D. Strayer, published by the Macmillan Company, New York.

A careful study of this book is required. A thorough understanding and appreciation of its contents will be found to be of very great practical benefit. The student's familiarity with the book will be taken for granted in the D Methods class, where it will be used as one of the textbooks. Some of the questions in the final examination in D methods will be taken from this book.

Fourth year students will write a summary of this book comprising not less than one thousand and not more than fifteen hundred words. The paper must be presented at the office of the Department of Music in the student's own handwriting on Monday, July 7.

History of Music and Current Events—C. This is a home-study course. An elementary examination in the history of music and current events for all C students will be given at 2:15 p. m. on Monday, July 7. (See History of Music D.)

History of Music and Current Events—D. A general knowledge of the history of music and a fair degree of familiarity with current events, especially in the world of music, is required. An examination will be given to the fourth year class covering only important and well known facts concerning the development of classical, romantic, and modern music; the great composers and their principal works; contemporary composers and their best known compositions; current events including knowledge of well known present-day orchestras, music festivals, composers, singers, players, conductors, music critics, etc.

Whatever special preparation is necessary must be made by means of home study. *A History of Music* by Stanford and Forsyth, published by The Mac-

millan Company, New York, is suggested as a textbook in the History of Music, and *Musical America* as a text for the study of current musical events. At least one question will have to do with general current events outside the subject of music. The examination at the 1919 Session will be held at 2:15 p. m., Monday, July 7.

Musical Appreciation—(Elective). W, 2:15. Mr. JOHNSTONE.

The analysis of musical art works with a view to forming a basis for intelligent criticism. The recognition of flaws and excellencies in a musical composition. Unity of design with variety of treatment. Rhythmic, melodic, and harmonic expedients employed by composers to portray varying emotional moods.

Musical instruments as means of expression. The orchestra and its instruments. Text: Johnstone, *Instruments of the Modern Symphony Orchestra* (published by Carl Fischer).

PROGRESSIVE SERIES OF PIANO LESSONS (Elective)

I. Elementary.

Daily except Sat., hours to be arranged. Mr. BRAUN.

II. **Intermediate.** Daily except Sat., hours to be arranged. Credit, two hours. Mr. KROEGER. Completion of Course I is a prerequisite for entrance to Course II.

Students who complete Course I and II will receive a certificate of qualification to conduct both the theoretical and practical examinations outlined in the standard requirements for High School Credits on the Progressive Series of Piano Lessons.

III. **Advanced.** Daily except Sat., hours to be arranged. Credit, two hours. Mr. KROEGER.

NORMAL COURSES IN PIANO TEACHING

I. Daily except Sat., hours to be arranged. Mr. BRAUN. This course covers the Elementary and Intermediate Grades of the Progressive Series of Piano Lessons; on completion the student will receive a certificate of qualification to teach these grades.

Only those students will be eligible to this Normal Course who possess a certificate that they have passed the examinations outlined in the Standard Requirements for High School Credits.

II. Daily except Sat., hours to be arranged. Mr. KROEGER. This course covers the Advanced and Graduate Grades of the Progressive Series of Piano Lessons; on completion the student will receive a certificate of qualification to teach these grades.

Only those students will be eligible to enter this Normal Course who possess a certificate that they have passed these examinations in the Advanced and Graduate Grades.

Any registered music teacher may attend the classes of the Normal Course, but certificates will be issued only as above provided.

Singing Games, Rhythms, and Folk Dances. 1. Observation of children's classes; daily health exercises; stories; rhythms; singing games and elementary

folk dances; their application to the teaching of music. **Classes of children in attendance daily.**

Daily except Sat., 10:10-10:55.

2. Teacher's course in connection with course 1, classified according to grades; methods of teaching.

Hours to be arranged. Miss ——.

Aesthetic Dancing Elementary technic; rhythmical steps and aesthetic movements; elementary solo, couple, and group dances.

Hours to be arranged. Miss ——.

Corrective work by individual appointment.

Students desiring a class in any special branch of Physical Education should consult the instructor.

STATE COLLEGE OF AGRICULTURE

OFFICERS

Jacob Gould Schurman, A.M., D.Sc., LL.D., President of the University.
Albert Russell Mann, A.M., Dean of the College of Agriculture and Director of the Experiment Station.
Cornelius Betten, Ph.D., Professor, Secretary, and Registrar.

STAFF OF INSTRUCTION

Floyd E. Andrews, Foreman of the Instruction Plant, Poultry.
Susan Sipe Alburtis, J. O. Wilson Normal School, Washington, D. C.
Arthur Augustus Allen, Ph.D., Assistant Professor of Ornithology
Charles Ethan Allen, B.A., Instructor in Histology and Anatomy, Albany Medical College, and Professor of Physiology, Albany College of Pharmacy.
W. P. Alexander, B.S., Assistant in Natural History.
Erford Lynn Banner, B.S., Instructor in Poultry Husbandry.
Marie M. Barry, Director of Recreation Club, Public Schools, Albany, N. Y.
Albert Reiff Bechtel, B.S., A.M., Instructor in Botany.
Beulah Blackmore, B.S., Assistant Professor of Home Economics.
Chester A. Buckner, A.B., Ph.D., Lincoln School, Teachers College.
Mrs. Anna Botsford Comstock, B.S., Assistant Professor of Nature-Study.
Lewis Josephus Cross, B.A., Ph.D., Professor of Chemistry in its Relations: Agriculture.
Allan Cameron Fraser, B.S., Instructor in Plant Breeding.
Arthur Kendall Getman, B.S., State Supervisor of Agricultural Education.
Jeanne Maclean Gray, B.A., Instructor in Physical Education, University of Wisconsin.
Julia Gleason, Instructor in Home Economics.
L. A. Hausman, M.A., Instructor in Biology.
Arthur John Heinicke, B.S.A., M.A., Ph.D., Assistant Professor of Pomology.
Frances Henry, A.B., Assistant Professor of Home Economics.
Laurence S. Hill, Director of Physical Education, Public Schools, Albany, N. Y.
Arthur Hollis, Supervisor of Physical Training, Whitestown, N. Y.
Ralph Sheldon Hosmer, B.S.A., M.F., Professor of Forestry.
F. Beatrice Hunter, B.S., Instructor in Home Economics.
C. H. Kennedy, B.S., Professor, University of North Carolina.
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George Nieman Lauman, B.S.A., Professor of Rural Economy.
David Lumsden, Assistant Professor of Floriculture.
Claude W. Leister, B.S. in Agr., Instructor in Ornithology.
William Foster Lusk, B.Ph., M.S.A., Professor of Rural Education.
Thomas Lyons Martin, B.A., Assistant in Soil Technology.
Robert Matheson, Ph.D., Assistant Professor of Entomology.
Clinton P. McCord, M.D., Health Director of Schools, and Instructor in Educational Hygiene, Albany Medical College.
C. L. Metcalf, A.M., Professor of Entomology, University of Ohio.
Edward Gardner Misner, B.S., Assistant Professor of Farm Management.
Margaret Morrison, Director of Physical Education and Dramatics, Darling Seminary, Westchester, Pa.
James George Needham, Ph.D., Professor of Entomology and Limnology.
Sydney Parsons, Instructor in Physical Training, Girls' High School, Brooklyn, N. Y.
Loren Clifford Petry, Ph.D., Assistant Professor of Botany, Syracuse University.
John M. Reed, B.A., Acting Director of Physical Education, Rensselaer Polytechnic Institute.
Frank Elmore Rice, A.B., Ph.D., Assistant Professor of Chemistry in its Relations to Agriculture.

Howard Waite Riley, M.E., Professor of Rural Engineering.

Louis Michael Roehl, Supervisor of Farm Shop Work.

Flora Rose, B.S., M.A., Professor of Home Economics.

Harold Ellis Ross, M.S.A., Professor of Dairy Industry.

Dwight Sanderson, B.S. in Agr., Professor of Rural Organization.

Mae Catherine Scheel, B.A., State Teacher of Physical Training, State of New York.

Henry William Schneck, B.S., M.S.A., Assistant Professor of Vegetable Gardening.

Rolland Maclaren Stewart, A.B., Ph.D., Professor of Rural Education.

James Lewis Strahan, B.S. in Agr., M.S., in Agr., Instructor in Farm Structures.

Clark Leonard Thayer, B.Sc., Instructor in Floriculture.

Jay R. Traver, A.B., Assistant in Nature Study.

Martha Van Rensselaer, A.B., Professor of Home Economics.

Harry A. Van Velsor, B.P.E., Physical Director, Hutchinson-Central High School, Buffalo, N. Y.

Grace Lydia Waterman, Director, Department of Physical Education, Emma Willard School, Troy, N. Y.

Karl McKay Wiegand, B.S., Ph.D., Professor of Botany.

George Alan Works, B.Ph., M.S.A., Professor of Rural Education.

John Eugene Wolf, Physical and Athletic Director, Lansdowne and Haverford School Districts, Pa.

COURSES IN THE COLLEGE OF AGRICULTURE

The New York State College of Agriculture provides courses of instruction under the rules and regulations that follow:

1. **Admission.** The summer school in the College of Agriculture is designed to meet the needs of persons engaged in educational work. Admission is limited to the following groups:

a) Teachers, supervisors, superintendents, extension workers, and others concerned with activities of an educational nature regardless of previous academic education.

b) Students who have satisfactorily completed at least two years of work in Cornell University or some other institution of equal standing.

c) Others who desire to fit themselves for immediate professional educational work.

Applicants for admission should send evidence of meeting these requirements to the Secretary of the College of Agriculture in advance of registration. The submission of this evidence will not constitute an obligation to attend, but is suggested merely as a means of avoiding delay at the time of registration.

2. **Tuition and Fees.** Tuition in any of the courses following is free to admitted students who are residents of New York State and who have been so for at least one year. Others will pay a tuition fee of \$30, whether one subject or more is taken. For the time and place of payment, see page 7.

In some of the courses a fee to cover the cost of materials used will be charged. An incidental fee of five dollars is charged all students in physical education.

Fee cards must be procured from the instructor at the first exercise, and returned to him receipted within five days.

3. For special announcement regarding Physical Education see p. 67. An outline of courses for garden supervisors will be found on p. 78.

4. **Academic Credit for Work.** For the requirements for the degree B.S. (eight terms, 120 hours, etc.), see the Announcement of the College of Agriculture.

ANIMAL HUSBANDRY

S 1. **Principles and Practice of Feeding Animals.** Credit, two hours. Lectures, M W F, 10. Practice, T Th, 10-12:30. Animal Husbandry Building.

The general principles of animal nutrition, based on Jordan's *Principles of Human Nutrition* as a text. The discussion of these principles will occupy most of the time given to lectures. The practice of feeding animals, based on Henry's *Feeds and Feeding* as a text. The discussion of the practice of feeding horses, cattle, sheep, and swine will occupy most of the time given to laboratory work, which will also include the study of feeding standards, the study of about forty home-grown and commercial feeds, the formulation of rations, and the like.

S 2. **Principles of Animal Breeding; Elementary Judging.** Credit, three hours. Lectures, daily except Sat., 9. Laboratory, T Th, 2-4:30. Animal Husbandry Building.

A general discussion of the principles of heredity as applied to the breeding of animals, with a study of animal form; origin and formation of breeds; crossing and grading, with an outline of the methods of registration and the study of records and pedigrees. Demonstrations, essays, and reports will be required in addition to the lectures.

The laboratory work will include practical handling of animals and methods of scoring and judging. Types and several breeds, particularly of dairy cattle, will be illustrated.

BACTERIOLOGY

S 1. **Bacteriology.** Credit, two hours. Lectures, T Th, 9. Dairy Building 222. Laboratory, M W F, 2-5. Dairy Building 122. Professor Ross

A general course in bacteriology covering the general characteristics of bacteria, methods of study, and their relation to the sanitary and economic phases of agriculture. It is especially designed for teachers of agriculture, botany, and biology. This course is given by the department of Dairy Industry. Laboratory fee, \$2.

BIOLOGY

S 1. **General Biology.** Credit, three hours. Lectures, daily except Sat., 11. Roberts Hall 392. Laboratory and field work, sec. A, M W F, 2-4:30; sec. B, T Th, 2-4:30, Sat., 8-10:30. Roberts Hall 302. Professor METCALF and Mr. HAUSMAN.

This is an elementary course designed to acquaint the general student and the prospective teacher with the principal ideas of biology through selected practical studies of the phenomena on which biological principles are based. Laboratory fee, \$2.50.

BOTANY

The courses in botany are planned to meet the needs of high school and college teachers, as well as to furnish information for persons not intending to teach.

The work will consist of lectures, laboratory work, and field work. The lecture and class-room work will be supplemented by lantern slides, charts, microscopes, slides, museum and herbarium material. It is likely that some round table discussions will be arranged.

The region about Ithaca is especially rich in plant life. Rarely, if ever, is a locality found that is better adapted for summer field work in botany. The richness of the fungous and the algal floras, as well as the great number of mosses, liverworts, ferns, and flowering plants, render field work here especially attractive and valuable. Special attention is given to the field botany, although other phases of the work are not ignored.

The country in the vicinity of the University is very diversified; marshes, fields, woodlands, ravines, and bogs all being accessible for day trips. Many short field trips will be taken and three longer all-day trips. Each student is expected to take at least two of the three all-day trips. The all-day trips will occur on Saturdays and will entail an extra expense of 50 cents to \$1.50 for each; one of the trips will cost \$2.50.

In addition to the laboratory fee in each course a deposit of \$2 will be required from each student to whom vasculums and other special apparatus are assigned.

S 1. Elementary Botany. Credit, three hours. Lectures, M W, 8. Laboratory, M W, 9-1. F, 8-1, with additional reading or field work. Botanical Laboratory, Agronomy Building. Assistant Professor PETRY and Mr. ———.

Representative plants from all the larger plant groups will be studied. Emphasis will be placed on structure and life history with particular attention to evolutionary relationship. Some attention will be given to the economic aspects of the different groups, and to their adaptation to surroundings. Field work will replace laboratory hours to a limited extent and some all-day trips will be required.

This is a general course planned as an introduction to the study of botany and as a preparation for advanced courses. It is intended also to cover certain phases of college entrance requirements and of general secondary school botany. Laboratory fee, \$3.50.

S 2. Elementary Morphology of Seed Plants. Credit, one hour. Lectures, T, 2-3. Laboratory, T, 3-5:30, Th, 2-4:30, with some additional reading. Botanical Laboratory, Agronomy Building. Assistant Professor PETRY and Mr. ———.

A study of the variation in form and structure of roots, stems, leaves, flowers, fruits, and seeds, together with the terminology concerned, and the advantages of these variations. Modified plant parts, pollination, and seed dissemination will receive attention. Fundamental internal structure will be treated briefly. Laboratory and field studies, conferences, recitations, and reading.

The course is arranged somewhat after the plan of Gray's *Lessons in Botany* and is designed as a preparation for systematic field botany and for persons desiring a general knowledge of the common plants. It also covers certain phases of secondary school botany. Identification is not a feature of this course. Laboratory fee, \$2.

S 4. Identification, Classification, and Ecology of the Higher Plants. Credit, two hours. Prerequisite: some training in structural botany taken previously or in connection with this course. Lectures, Th, 8. Laboratory or field, T, 8-1, Th, 9-1. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Mr. BECHTEL.

A comprehensive study of the wild flora about Ithaca, with reference to the practical recognition of species and varieties as well as to the floral and foliar characteristics of these species and to the grouping of them into genera, families, and more comprehensive groups. The course consists of field and laboratory work, but is supplemented by general discussions and lectures on the broader questions of classification, nomenclature, distribution, and habitat. The ecological association and modifications of the various species and varieties will be noted. The course is intended to supply teachers and others with a general knowledge of the flora. Some all-day trips are required. Supplementary instruction will be given in the preservation of material for the museum and for the herbarium.

If necessary this course will be divided as follows: A. For those beginning this type of work. B. For students who already possess some knowledge of the flora. Laboratory fee, \$2.50.

S 5. Trees and Shrubs. Credit, two hours. Prerequisite: some training in structural botany, taken previously or in conjunction with this course. Lectures, W, 2. Laboratory or field work, M, 2-5, W, 3-5, F, 2-5. Agronomy Building. Mr. BECHTEL.

A course intended for those who desire more concentrated work on the woody plants of our flora than can be obtained in course S 4. The aim is to familiarize the student with as many as possible of the trees and shrubs in the Cayuga Lake flora, their floral and foliar characters, their structure, methods of growth, habits, and distribution. Much of the work will be in the field, supplemented by laboratory practice, lectures, and demonstrations. Some all-day trips are required. Laboratory fee, \$2.50.

S 8. Identification and Classification of Lichens, Liverworts, Mosses, and Ferns. Credit, one hour. Prerequisite: a general knowledge of structural botany. Laboratory and field work, T Th, 2-5, with some additional work by appointment. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Assistants.

An introduction to the four groups of plants indicated by the title of the course. The student will become acquainted with the general structural characteristics of different members of these groups, and will receive practice in tracing the various species through the keys. The field trip is planned to acquaint students with the flora of our ravines and swamps which are especially rich in lichens, liverworts, mosses, and ferns. Material will be collected, identified, and mounted in standard packets, and will become the property of the student. Some all-day trips are required. Laboratory fee, \$2.

CHEMISTRY

S 83. Organic Chemistry. Credit, three hours. Prerequisite Chemistry 1 (inorganic chemistry) or its equivalent. Lectures, daily, 9. Caldwell Hall 100. Professor CROSS.

Chemistry S 83 and S 84 are courses in pure organic chemistry wherein are especially emphasized those chapters relating to plant and animal life, foods, feeding stuffs, fertilizers, soils, and insecticides.

S 84. Organic Chemistry Laboratory. Credit, two hours. Prerequisite Chemistry 6 (qualitative and quantitative analysis) or its equivalent; must be accompanied or preceded by Chemistry S 83 or its equivalent. Caldwell Hall 250. Fourteen hours a week required, time to be arranged. Consult Assistant Professor RICE not later than registration day.

Organic compounds are prepared, and their properties studied. Special emphasis is placed on technique and manipulation of apparatus. Recitations are held during the laboratory periods.

S 86. Agricultural Chemistry. Introductory course. Credit, two hours. Prerequisite Chemistry 6 (qualitative and quantitative analysis) or its equivalent. Caldwell Hall 250. Fourteen hours a week required, hours to be arranged. Consult Assistant Professor RICE not later than registration day.

This is primarily a laboratory course wherein are introduced methods for making tests and the simpler analyses of plant materials, feedstuffs, soils, fer-

tilizers, insecticides, and fungicides, with the end in view of giving the student a clear knowledge of their chemical composition and behavior. Recitations are held during the laboratory periods.

S 95. Elementary Food and Household Chemistry. Credit, two hours. Prerequisite Chemistry I (inorganic chemistry) or its equivalent. Lectures, daily except S, 11. Caldwell Hall 100. Professor CROSS.

This course treats of the chemistry of foods, beverages, baking chemicals, preservatives, and detergents.

S 96 (1). Analysis and Testing of Foods and Household Materials. Credit, two hours. Prerequisite, Courses 6, 83, 84 (or their equivalents, qualitative and quantitative analysis, organic chemistry, lectures and laboratory). Caldwell Hall 250. Fourteen hours a week required; hours to be arranged. Consult Assistant Professor RICE not later than registration day.

The conventional "complete" analysis of carbohydrate foods is made. The behavior from the chemical point of view of proteins, fats, carbohydrates, soaps, potable water, baking powders, jellies, sirups, butter, oleomargarine, olive oil, salad oils, cheese, milk, food preservatives, artificial coloring, flavoring extracts, habit forming agents, tooth powders, textiles, etc., is given in an introductory way. Recitations are held during the laboratory periods.

S 96 (2). Analysis and Testing of Foods and Household Materials. Introductory Laboratory Course. Credit, two hours. Prerequisite Chemistry I and 83, or their equivalent (inorganic chemistry and organic lectures). Time, same as course S 96 (1).

The subject matter of this course is similar to that of S 96 (1) but more elementary. It will be accepted in fulfillment of the Household Chemistry laboratory requirement for regular Home Economics students.

S 116. Special Topics and Research. Students desiring special advanced work in soils, fertilizers, insecticides, fungicides, foods, dairy products, feeding stuffs, condimental stock feeds, etc., or those taking research should register for this course. One to three hours may be taken. Consult Professor CROSS or Assistant Professor RICE not later than registration day.

DAIRY INDUSTRY

S 1. Dairy Industry. Credit, one hour. Lecture, T, 10. Dairy Building 222: Laboratory, W, 2-4:30; S, 9-11:30. Dairy Building 132. Professor ROSS.

A general course dealing with phases of dairy work of special interest to dairy farmers. The course will include work in testing dairy products, methods of producing and handling market milk, care of dairy utensils, cooling, factors influencing keeping quality, relation of bacteria to value of market milk, determination of percentage of fat and production of individual cows, relative value of milk with different percentages of fat for manufacturing butter and cheese. Modifications will be made to adapt the course to the needs of the students.

ENTOMOLOGY

S 4. Elementary Morphology of Insects. Credit, three hours. Laboratory, open daily except Sat., 8-5; Sat., 8-1. Twenty-one hours of laboratory work a week required. Roberts Hall 391. Mr. ———.

An introductory laboratory course required of all students who plan to do advanced work in entomology. Laboratory fee, \$2.

S 5. Elementary Systematic Entomology. Credit, two hours. Fifteen hours of laboratory work a week required. Must be preceded or accompanied by course S 4. Laboratory open daily except Sat., 8-5; Sat., 8-1. Roberts Hall 391. Mr. ———.

Practice in the identification of insects, and in the method of phylogenetic study as illustrated by their wing venation. With course 4, required of all students who plan to do advanced work in entomology. Laboratory fee, \$3.

Members of the summer session may attend, in Roberts 392, Professor Needham's long-term course in the Ecology of Insects (Course 2: Lecture W, 8) or Professor Matheson's course in General Entomology (Course 3: Lecture W F, 9) without credit.

FARM MANAGEMENT

S 1. Farm Management. Credit, three hours. Lectures, daily, 8. Laboratory, M W, 2-5. Farm Management Building

This course is designed to meet the needs of teachers in vocational courses.

FLORICULTURE

S 1. Garden Flowers. Credit, one hour. Lectures, M W, 8. Laboratory, F, 2-4:30. Greenhouses. Assistant Professor LUMSDEN and Mr. THAYER.

This is designed as an elementary course to be of value for home flower garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this line of work, and to cover methods of propagation and culture.

S 2. Indoor Flower Growing. Credit, one hour. Lectures, T Th, 11. Laboratory, T, 2-5. Greenhouses. Mr. THAYER.

The propagation and culture of plants suitable for winter gardens in school rooms, including a study of containers, soils, fertilizers, insecticides, are the basis of this course. The selection of varieties of bulbs and their methods of culture indoors are also considered, as is also the method of propagation and general care of species of plants suited for indoor culture.

S 3. Arrangement for Annuals and Herbaceous Perennials in the School Garden. Credit, one hour. Lectures, T Th, 10; Laboratory, M, 2-4:30. Greenhouses. Assistant Professor LUMSDEN.

A study of the principles and methods governing the selection of site and the arrangement of plant materials in the school garden; the planning and planting of flower borders to give a continuous display of bloom throughout the school year. Individual problems will be handled and aesthetic taste in color arrangement studied.

FORESTRY

S 1. Forests and Forestry. Credit, one hour. Lectures, M W F, 9. Forestry 118. Field work, F, 2-5. Professor HOSMER.

A course of lectures and field work, designed primarily for teachers who desire to connect popular instruction in forestry with botany and biology. The subjects covered will be the identification of the more common trees, the uses of wood and wood products, tree planting and the care and management of woodlands. Several lectures will be devoted to a broad survey of the field of forestry, with especial reference to the present needs of the State and the Nation, including the principles underlying the protection and wise use of the timber resources of the country, the aims and importance of forestry, and a brief account of the day's work of a forester. As far as possible the lectures of each week will be followed by practical observation lessons in the field, which will afford opportunities to see the application of the principles discussed in the lectures.

HOME ECONOMICS

S 1. Survey Course in Foods. Credit, four hours. Lectures and recitations, daily except Sat., 12. Home Economics Building 245. Laboratory practice, daily except Sat., 9-12. Home Economics Building 270. Miss ———.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the sources, composition, and characteristics of food-stuffs; principles governing the selection of foods and methods of preparing them, comparative nutritive values and cost of foods. The laboratory work will follow the lectures closely, and will consist of experiments in determining the characteristics of food-stuffs and practical problems in the preparation of food. The number registering for this course is limited to forty. This course does not parallel the regular course and is not accepted as a substitute from regular students. Laboratory fee, \$10.

S 3. An Introductory Course in Foods. Credit, five hours. Prerequisite, general Biology and general Chemistry. Lectures, daily except Sat., 8. Home Economics Building 245. Practice, daily except Sat., 9-1. Home Economics Building 200. Assistant Professor HENRY.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the composition and characteristics of foodstuffs; sources and methods of manufacture of foods; principles of selection and methods of preparation of foods; preservation of foods; conservation of foods; comparative nutritive and economic values of various foods. Laboratory practice in applying scientific principles to food-preparation will be given. This course parallels the regular course in foods and will be accepted as equivalent to the first term's work in Foods 3. Laboratory fee, \$15.

S 4. Dietetics. Credit, three hours. Lectures and recitations, daily except Sat., 11. Home Economics Building 100. Laboratory practice, T Th, 2-5.30. Home Economics Building 200. Written reviews for those wishing credit in the course, Sat., 11. Professor ROSE and Assistant Professor HENRY.

This course will include discussion of the fundamental principles of nutrition as these apply to the human being; the practical means of applying scientific

principles in planning dietaries; special problems of nutrition, as the feeding of infants and children. The laboratory work will consist of exercises in estimating comparative cost and nutritive value of various foods; in planning and judging various types of dietaries; in preparing typical meals. Open only to students who have had course S 1 or its equivalent. This course does not parallel the regular course and is not accepted as a substitute from regular students. Laboratory fee, \$7.50.

S 6. Home Economics in the Rural Schools. Credit, two hours. Lectures and laboratory practice, daily except Sat., 11-1. Home Economics 200. Miss McNIEL.

A course planned to give teachers in the rural schools material on which to base practical Home Economics instruction. A few of the essential phases of cooking, sewing, and sanitation will be studied with reference to their use in the schools of the village or open country. Laboratory fee, \$5.

S 14. Household Management. Credit, two hours. Lectures, daily except Sat., 8. Home Economics Building 100. Written reviews for those desiring credit in the course, Sat., 8. Professor VAN RENSSELAER.

Lectures will discuss division of income, household accounts, factors in cost of living from the housekeeper's standpoint, domestic service, household equipment, means for saving labor, and general management of the house. This course parallels the lectures in the regular course in Household Management and will be accepted as equivalent to the lectures of that course.

S 15c. Introductory Course in Clothing and Textiles. Credit, two hours. Practice, daily except Sat., 2-5. Home Economics Building 305. Number of students limited to fourteen. Miss GLEASON.

This course includes hand and machine sewing, the use of commercial patterns, drafting and designing of patterns, household mending and simple embroidery. A cooking apron, a combination suit, a lingerie blouse, and a petticoat are made. The work consists of demonstrations, discussions, and practice. Students provide all materials subject to the approval of the instructor. This work will be accepted as part credit from regular students. Estimated expense, \$10 to \$12. Laboratory fee, \$3.

S 16a. Draping, Drafting, and Designing. Credit, two hours. Prerequisite, course S 15c or its equivalent. Number of students limited to fourteen. Practice, daily except Sat., 8-10:30. Home Economics Building 305. Miss GLEASON.

This course includes drafting, designing, and modelling of patterns for various types of figures and garments. The work consists of lectures, demonstrations, discussions, and practice. Students provide all materials subject to the approval of the instructor. Estimated expense, \$3 to \$5. Laboratory fee, \$3.

S 17. Selection and Design of Clothing. Credit, two hours. Prerequisite, courses S 15c, S 16a, and S 18, or their equivalents. S 18 may be taken parallel with S 17. Number of students limited to fourteen. Practice daily except Sat., 2-5, Home Economics Building 300. Miss HUNTER.

This course should follow immediately course 16 and costume design. This course includes the making of a cotton dress modeled in 16, a wool dress, and a silk waist. The work consists of demonstrations, discussions, and practice. The

economical purchase of a wardrobe will be considered and the comparison of commercial products with those made at home. Students provide all material subject to the approval of the instructor. Estimated expense, \$15 to \$20. Laboratory fee, \$2.

S 18. Costume Design. Credit, two hours. Practice, daily except Sat., 8.00-10:30, Home Economics Building 415. Miss HUNTER.

This course includes a study of the fundamental principles of design as expressed in modern and historic costumes. Students develop these principles by modeling in paper and other materials. The object of this course is to develop clear judgment with respect to design and color in clothing. Estimated expense, \$5. Laboratory fee, \$3.

S 19. Textiles. Credit, two hours. Practice, M W F, 10.30-1. Lectures, T Th, 11-12. Home Economics Building 305. Assistant Professor BLACKMORE.

This course includes: (a) a simple history of the processes of manufacture, spinning, weaving, and finishing of cotton, wool, silk, and linen; (b) an intensive study of fabrics with a view to their appropriateness in clothing, and an analysis of weaves and making of textile cards; (c) microscopic identification and chemical testing of fabrics; (d) simple dyeing; (e) stain removal. Estimated expense, \$5. Laboratory fee, \$2.

S 23. Extension Course in Home Economics. Credit, five hours. Lectures daily except Sat., 9-11. Home Economics Building 100. Laboratory, daily except Sat., 2-5. Professors VAN RENSSELAER, BURRITT, and ADAMS.

Only those persons will be admitted to this course who have had at least the equivalent of a two-year course in Home Economics and who have had two or more years of successful experience in extension work or teaching.

This course embraces a study of the purpose of Home Economics Extension; of legislation which affects it; of project making; of ways of organizing and presenting subject matter projects to groups and individuals; of problems of field organization; of methods of presentation; of various types of Home Economics Extension work. Opportunity for field work and development of projects will be offered to those who are qualified for extension work. To others opportunity will be given for observation.

This course is designed to meet a growing need for trained extension workers. It is planned for those persons who already have knowledge of Home Economics subjects and who wish to familiarize themselves with channels through which extension work may be carried and with methods of extension teaching.

Persons well trained in the subject matter who desire to fit themselves for extension positions are advised to take Rural Organization S 1, in addition to this course.

Laboratory fee, \$5. In addition there will be the expense of travel to neighboring places.

LANDSCAPE ART

S 3. The Arrangement and Planting of Home and School Grounds. Credit, one hour. Lecture, F, 8. Laboratory, T Th, 2-4:30. Landscape Art Building. Professor CURTIS.

An introductory course of illustrated lectures to explain some fundamental principles and of field trips to identify and explain the use of important landscape plants. The purpose of this course is to give the students a point of view in landscape work and, in addition, to offer some specific suggestions for the solution of simple problems.

NATURE-STUDY

S 1. General Nature-Study. Credit, two hours. Lectures, M W F, 10. Field and laboratory observations, T Th, 10-12.30. Roberts Hall 302. Assistant Professor COMSTOCK.

The object of this course is to train teachers in making personal observations along several lines of nature-study and to give them a foundation for carrying on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, and plants. Special attention will be given to observing the relation of insects to flowers of field and garden. The lectures will supplement the field and laboratory work, and will also present practical methods for conducting nature-study in the grades.

S 2. Natural History of the Farm. Credit, one hour. Lectures, M, 8. Roberts Hall 392. Field work, sec. A, T Th, 2-5; sec. B, W F, 2-5. Mr. ALEXANDER.

This is primarily a field course, treating of the wild inhabitants of the fields, woods, marshes, and streams of the farm. Wild organisms will be compared with domesticated ones, and the availability of certain wild forms for cultivation will be pointed out.

The following topics, among others, will be studied: wild fruits, wild roots, wild cereals, deciduous trees, evergreens, pasture plants and their fitness for pasture conditions, wild birds, wild mammals, and fishes and other inhabitants of the farm stream.

Each student will be required to do a considerable part of the work individually. Field reports must be handed in weekly and these will be carefully graded. Laboratory fee, \$1.

S 3. Nature Literature. Credit, one hour. Lectures, M W, 12. Insectary. Only those who have had course S 1 are eligible. A course on nature-study, reference books, and nature-literature. Assistant Professor COMSTOCK.

S 4. Friends and Enemies of the Garden. Credit, two hours. Lectures, T Th, 8. Laboratory and field work, M W F, 9-11. Insectary. Professor C. H. KENNEDY.

This course is designed especially as an aid to teachers of gardening. It deals with common garden insects and their natural foes. The laboratory periods are devoted to a personal study of the life histories of insects and methods are employed that may be used in nature-study lessons supplementary to school gardening.

PHYSICAL EDUCATION

Object. Legislation requiring that physical training shall be taught in public schools has created a demand for teachers and supervisors of this subject. There is also need for teachers who can supervise health education, for playground supervisors, and for coaches and athletic directors. In order to assist persons who desire to prepare for work of this kind, the New York State College of Agriculture has designed a schedule of carefully graded courses requiring four summer schools for completion. This arrangement of work enables students, teachers, and supervisors to enter upon a complete and systematic study of physical education until the summer school certificate has been earned. It also enables them to engage in teaching during the year and thus acquire necessary experience.

Tuition. See page 57. Admission to classes is restricted to the duly registered students. All students registered for physical education are required to pay an incidental fee of \$5.

Advanced Standing. Students desiring advanced standing in physical education will be required to send a certified copy of the courses in which they wish to receive credit, with a statement of the amount and character of work accomplished, to Laurence S. Hill, in care of the College of Agriculture, Ithaca, N. Y., at least one week before the session opens, or to pass an examination in those subjects in which they wish to receive credit. Examinations for this purpose will be conducted in Roberts Hall, July 5 at 9 o'clock.

Certificates. At the end of each summer session a certificate of attendance is issued to all students completing satisfactory work. See page 9. Students desiring to receive the summer school certificate in physical education will be required to complete the work as outlined for the four summer schools or their equivalent. No certificate will be awarded to any student who has not attended at least two full sessions. No student will be admitted to the courses without approval of his program. Students doing satisfactory work will be recommended for temporary certificates. Upon the completion of the four years of work, they will be recommended for a permanent certificate in such states as grant these certificates.

Admission. See page 57.

For those desiring to equip themselves as playground teachers and directors the following courses are essential:

- Physical Education S 1. Hygiene.
- Physical Education S 4. School Yard Athletics.
- Physical Education S 11. Educational Psychology.
- Physical Education S 20. Physical Diagnosis.
- Physical Education S 33. Pageantry.
- Physical Education S 8. Track and Field Athletics.
- Physical Education S 35. Swimming.

Activities: Games of low and high organization; apparatus; rhythmic steps; folk dancing; English and American country dancing; special features, organized games, and general practice.

For those desiring to equip themselves as athletic coaches, the following courses are essential:

- Physical Education S 30. First Aid.
- Physical Education S 29. Special Methods.
- Physical Education S 31. Mechanotherapy.
- Physical Education S 2. First Year Practice.
- Physical Education S 32. Fourth Year (Special) Practice.
- Physical Education S 4. School Yard Athletics.
- Physical Education S 6. Soccer.
- Physical Education S 7. Base Ball.
- Physical Education S 8. Track and Field Athletics.
- Physical Education S 9. Hockey and Tennis.
- Physical Education S 10. Football.

Class-room teachers who wish to become acquainted with playground activities and their direction and supervision, should confer with Mr. Hill regarding the proper courses to meet their special problems.

Costumes. Women *must* provide themselves with all-white middy blouses (no colored collars), black or dark blue bloomers, black stockings, black ties, and white tennis shoes.

Men *must* provide themselves with quarter-sleeve tennis or gymnasium shirts, long Y. M. C. A. trousers (blue with white stripe), and white tennis shoes.

Residential halls, rooms, board. See page 9. It is suggested that women students in Physical Education apply for rooms in Sage College, in which one of the gymnasiums is located. Rooms are reserved in the order of application.

FIRST YEAR

S 1. Hygiene. Credit, two hours. Daily, 8. ————. Dr. McCORD. The course will consist of lectures, lantern slide and chart exhibits, and practical demonstrations of method. The general laws of health will be discussed, including the essentials of sanitary science, personal hygiene, community hygiene, home hygiene, and the public health movement in general. The recognized divisions of educational hygiene will be considered with special emphasis upon the scope and methods of school medical inspection, school nursing, control of communicable diseases in the schools, operation of school clinics, organization of health clubs, location and treatment of children mentally or physically exceptional or defective, the approach to nutritional problems of school children, and the development of systems of records in the administration of the above lines of health activity.

The work of the school nurse will be considered in detail, and the training in practical methods will be of a character to render correlation or actual amalgamation of the duties of the school nurse and the teacher of physical training effective where such fusion may seem desirable.

Special attention will be given to the consideration of rural health problems as they present themselves to a community health leader or organizer. The health problems peculiar to high schools and gymnasiums will also be indicated with certain aspects of school sanitation of special significance in the daily routine of the worker in health education.

S 2. First Year Practice. Credit, two hours. Daily except Sat. p. m., 9-11, 3:30-4:30. Gymnasium.

This course includes elementary practice in calisthenics, schoolroom tactics, Swedish gymnastics, rhythmic steps, Indian clubs, wands, dumb-bells, apparatus, tumbling, aesthetic and athletic dancing, and games of low and high organization.

S 3. Histology and Anatomy. Credit, two hours. Lectures and laboratory, daily, 11-1. Dr. McCORD and Mr. ALLEN. Laboratory fee, \$1.

In this course the various tissues and organs of the human body will be studied briefly in their minute structure in the laboratory. This work will be supplemented by lectures illustrated with charts and lantern slides. Demonstration of specially prepared microscopic sections including a brief consideration of embryology will be included.

Anatomy in its gross aspect will be presented through the medium of charts, models, diagrams, lantern slides, museum preparations, and living models, the chief purpose being to familiarize the student with the anatomy of the body as it presents itself to the teacher of physical training.

S 4. School Yard Athletics. Credit, one hour. Daily except Sat., 2:30. Gymnasium and Athletic Field. Mr. HILL.

(a) Group Athletics:

In this course the general idea of group athletics, the badge test, organizations, and athletic meets, with special reference to rural districts, will be taken up and practical demonstrations given.

(b) Conduct of Playgrounds; Construction and Equipment.

This course deals with play programs, how to organize a playground staff, how to plan and construct a playground, its equipment, the field house and the details concerned in playground management, administration of municipal recreation, legislation, budget-making, the relation of recreation executives to the community and various activities.

SECOND YEAR

Rural Education. Course S 1. Daily except Sat., 8. See page 75.

S 12. Second Year Practice. Credit, two hours. Daily except Sat. p. m., 9-11, 3:30-4:30. Gymnasium.

Second year or intermediate practice includes wands, tactics, Indian clubs, dumb-bells, Swedish gymnastics, tumbling, apparatus, singing games and story plays, aesthetic and athletic dancing, and games of low and high organization.

S 13. Physiology. Credit, one hour. Daily, 11. ———. Dr. McCORD.

This course will cover the general phases of physiology that are of interest to the teacher of physical training.

S 14. Public Speaking. Credit, two hours. Daily except Sat., 12. G. S. 26. Assistant Professor HUNT.

Training in correct and effective speech; with particular attention to tone and distinctness of utterance. Brief speeches before the class.

THIRD YEAR

Rural Organization. Course S 1, Daily except Sat., 8. See page 78.

S 20. Physical Diagnosis. Credit, one hour. Daily, 9. ———. Dr McCORD.

The course is designed to familiarize the student with methods of physical examination and the modern diagnostic procedures available. The normal will first be demonstrated and then the various departures from the normal will be indicated and discussed. The diagnosis of the diseases and physical defects of school children will be covered from the practical aspect and with the aim of giving the student a working knowledge of the conditions she will actually face in daily routine as a school nurse or a teacher of physical training.

Rural Education S 2. Daily except Sat., 10. See page 75.

S 22. Third Year Practice. Credit, two hours. Daily except Sat., p. m., 1-11; 3:30-4:30. Gymnasium.

This course includes advanced work in Swedish gymnastics, tactics, apparatus, Indian clubs, wands, folk dancing, highly organized games such as volley ball, captain ball, and basketball, aesthetic and athletic dancing, and games of low and high organization.

S 24. Kinesiology. Credit, one hour. Daily except Sat., 2:30. ———. Miss GRAY.

This course deals with the principles and mechanisms of bodily movements. The mechanism of representative types of exercise is studied for the purpose of determining, as far as possible, their immediate and permanent effects upon health.

FOURTH YEAR

S 29. Method and Practice of Teaching Physical Education. Credit, two hours. Daily, 8. Demonstrations, M W F, 9. Gymnasium. Mr. HILL.

This course will include the theory of teaching gymnastics and calisthenics, simple gymnastic positions, and movements, miscellaneous exercises, gymnasium tactics, and apparatus work; the pedagogical principles involved in calisthenics or drills, the physiological principles, general order of exercises in a drill, factors which should guide in the selection of exercises; how to write a drill and how to plan gymnastic lessons for use in the elementary schools; the principles of posture, normal and abnormal.

The methods of teaching physical training, observation, and criticism, and the actual presentation of assigned work will be included in this course. Work adapted to rural schools will receive special emphasis. Practice under schoolroom conditions with children of various grades will be offered.

S 30. First Aid. Credit, one hour. T Th S, 9. ———. Mr. ALLEN.

The principles and methods of first aid will be fully discussed and demonstrated, stress being placed upon the actual practice by the student of the various procedures under the direct supervision of the instructor. The course will completely cover the requirements of the Red Cross First Aid Certificate.

S 31. Mechanotherapy. Credit, one hour. Daily, 10. ———. Miss WATERMAN.

(a) Prescription of exercise: diagnosis, selection, and arrangement of exercise, commensurate with patient's age, strength, general constitution, and mode of living. Exercise for the correction of postural and structural defects.

(b) Massage: principles and application of massage; object of treatment; physiological effects; general rules.

S 32. Fourth Year Practice. Credit, two hours. Daily except Sat., p. m., 11-1; 3:30-4:30.

Work in special features; military drill, apparatus, English country dancing, American country dancing, folk dancing, Indian clubs, highly organized games, interpretative and athletic dancing, and games of low and high organization, are taught in this course, which is for advanced students.

Electives

S 23. Pageantry. Credit, one hour. Daily, 2:30. H. E., 100. Miss PARSONS.

Lectures and demonstrations on pageantry. The history of pageantry; its educational and community value; the relation of history, poetry, song, folk lore, and drama to pageantry; the writing, directing, and producing of a pageant; grouping and pageant acting; costuming; the production of a pageant, if conditions permit. The production of small festivals and school celebrations for various occasions. The class will plan original scenes and episodes. Interpretative dancing, offered in the fourth year, will be closely allied with this course.

S 35. Swimming. Daily, except Sat. Hour to be arranged.

Instruction in swimming, life saving, and resuscitation. The various swimming strokes will be demonstrated and taught. The course is open to a limited number. Special fee, \$10.00.

Athletic Courses

(Required of candidates for the certificate)

It is not possible for students to complete the following athletic courses in any one summer. Students are asked to choose wisely and extend the work of the afternoon program over two or more years.

S 6. Soccer. Credit, one hour. Daily except Sat., 4. Girls' Athletic Field. Mr. WOLF.

Full instruction is given in soccer, a game similar to field hockey, in which the same formation is used. The game is extremely popular, especially in rural communities.

S 7. Base Ball. Credit, one hour. Daily, 3:30. Athletic Field. Mr. REED.

Theory and field practice. Batting; bunting; fielding; base running; position play; offensive team play; defensive team play; battery strategy; training a school team; base sliding; drawing throw to first, second, or third; hit and run; positions infielders should play; discussion of rules.

S 8. Track and Field Athletics. Credit, one hour. Lectures and practice, daily except Sat.; for men 4:30, Schoellkopf Field; for women, 4:30, Girls' Athletic Field. Miss GRAY and Mr. ———.

The work consists of the theory and practice of the various track and field events for men and women, such as hurdling, standing and running broad jump, standing and running high jump, racing start, short and long distance running, shot put, base ball throw, and basketball throw. The duties of officials are thoroughly explained, studied, and practiced; meets are organized and run.

S 9. Hockey and Tennis. Credit, one hour. Alternating days, 4:30. Girls' Athletic Field. Miss WATERMAN.

Full instruction is given in field hockey, a popular athletic game, which affords exhilaration as well as plenty of vigorous exercise. A definite explanation and a thorough study of each rule is made, the advantages and disadvantages of certain

plays are fully discussed and demonstrated, and actual participation in competitive games is experienced. In tennis the various strokes, methods of serving and receiving are taught, as well as the advantages of matches and tournaments.

S 10. Football. Credit, one hour. Daily except Sat., 4:30. Gymnasium and Schoellkopf Field. Mr. REED.

Theory and field practice. Training and demonstrations; discussion of preliminary and fundamental football; pre-seasonal conditioning; falling on the ball; how to hold a ball; punting; place; drop kicking and goal kicking from touchdown; use of the straight arm; judging and catching punts; kick off—different formations used; positions of play and how to play them; system of signals; generalship; offensive and defensive tactics; teamwork; formations and plays; systems of coaching; discussion of rules.

Basketball. Theory and Practice. This course is offered as part of the Third and Fourth Year Practice Courses, S 22 and S 32.

Technique of basket shooting, shooting from the foul line, catching and passing the ball, how to select forwards, centers, and guards, training, formations used, different styles of play, team work, systems of signals, discussion of rules.

Men and women take most of the practical work in common, except the heavier forms of gymnastics and athletics.

S 40. General Course in Calisthenics and Recreation for the Class-room Teacher. Credit, one hour. Daily except Sat., 8. Gymnasium. Mr. HOLLIS.

Drill in giving response and rhythmic commands, securing responses, graded marching tactics, free gymnastics, mimetic exercises, rhythmical steps, and supervised recreational activities. The various divisions of the state syllabus of physical training and contents will be considered.

ORNITHOLOGY

Courses in ornithology as announced on page 39 are open without tuition charge to students registered in the College of Agriculture Summer School.

POMOLOGY

S 1. General Fruit Growing. Credit, three hours. Prerequisite Botany S 1 or its equivalent. Lectures and recitations, daily 11. Roberts Hall 292. Laboratory, M W, 2-4:30. Roberts Hall 202. Professor HEINICKE.

A study of the methods of propagation and early care of commercial fruits, including the growing of seedlings, cuttings, and layers; principles of budding, grafting, pruning, and planting; soils, varieties, and planting plans for the orchard; cover crops, cultivation, fertilization, spraying, pruning and thinning, as practiced in orchard management; picking, grading, packing, storing, and marketing of fruit. This course considers the apple, pear, quince, cherry, plum, apricot, peach, nuts, and small fruits.

S 2. Advanced Pomology. No credit toward graduation. Prerequisites: Botany S 1 and Pomology S 1, or the equivalent. Lectures, T Th S, 9. Roberts Hall 292. Mr. ———.

This course includes a comprehensive study of varieties and judging of fruits and a study of the characters and botanical relationships of the fruits of the United States. Each student is required to collect and mount a number of varieties and species. A trip to Geneva will occupy one afternoon or a Saturday sometime during the course.

PHYSICAL EDUCATION PROGRAM—1919

Hour	First Year	Second Year	Hour	Third Year	Fourth Year
8:00- 9:00	General Course for Teachers of the One-Room School (S 40)	8:00- 9:00 Rural Organization (S1)	8:00- 9:00	Rural Organization (S1)	Special Methods, (S29)
8:00- 9:00	Hygiene (S 1)	9:00-10:00 Physical Diagnosis, (S20)	9:00-10:00	Physical Diagnosis, (S20)	Demonstration School, M. W. F.
9:05- 9:25	Calisthenics, M. W. F.	10:00-11:00 Rural Education, (S2)	10:00-11:00	Rural Education, (S2)	First Aid, T. Th. S. (S31)
	Tactics, T. Th. S.	11:05-11:25 Swedish, M. W. F.	11:05-11:25	Swedish, M. W. F.	Mechanotherapy, (S81)
9:30- 9:50	Swedish, M. W. F.			Tactics, T. Th. S.	
	Dumb-bells, T. Th. S.	11:30-11:50 Apparatus, Men	11:30-11:50	Apparatus, Men	Apparatus, Men
9:55-10:15	Indian Clubs, M. W. F.	Apparatus, Women		Apparatus, Women	Apparatus, Women
	Wands, T. Th. S.	11:55-12:15 Indian Clubs, M. W. F.	11:55-12:15	Indian Clubs, M. W. F.	English Country Dancing, M. W. F.
10:20-10:40	Rhythmic Steps, M. W. F.			Wands, T. Th. S.	American Country Dancing, T. Th. S.
	Apparatus, T. Th. S.	12:20-12:40 Folk Dancing, M. W. F.	12:20-12:40	Folk Dancing, M. W. F.	Indian Clubs, M. W. F.
10:40-11:00	Tumbling, M. W. F.	Basketball, T. Th. S.		Basketball, T. Th. S.	Basketball, T. Th. S.
	Apparatus, T. Th. S.	12:40- 1:00 Games, M. W. F.	12:40- 1:00	Games, M. W. F.	Games, M. W. F.
11:00-12:00	Histology and Anatomy (S3)	Basketball, T. Th. S.		Basketball, T. Th. S.	Basketball, T. Th. S.
	Lecture and Laboratory	Kinesiology, (S24)		Kinesiology, (S24)	Pageantry, (S33) (Elective)
12:00- 1:00	Histology and Anatomy	Aesthetic Dancing		Aesthetic Dancing	
	Lecture and Laboratory	Games of Low and High		Games of Low and High	Interpretative Dancing, or
2:30- 3:30	School-Yard Athletics (S4)	Organization, or		Organization, or	Games of Low and High
3:30- 4:00	Aesthetic Dancing	Soccer (S6)		Soccer (S6)	Organization, or
4:00- 4:30	Games of Low and High	Base Ball (S7)		Base Ball (S7)	Soccer (S6)
	Organization, or	Athletic Dancing,		Athletic Dancing,	Base Ball (S7)
	Soccer (S6)	Track and Field Athletics (S8), or		Track and Field Athletics (S8), or	Track and Field Athletics (S8) or
3:30- 4:30	Base Ball (S7)	(S8) or		(S8) or	Hockey and Tennis (S)
4:30- 5:00	Athletic Dancing, or	Hockey and Tennis (S9)		Hockey and Tennis (S9)	Hockey and Tennis (S)
	Track and Field Athletics (S8), or	Football (S10)		Football (S10)	Football (S10)
	Hockey and Tennis (S9)				
4:30- 5:30	Football (S10)				

The letter and number in parenthesis after the name of a course refer to the course as announced in the Summer School Announcement. Note that the afternoon program in the practical and athletic courses is the same for all four years, except aesthetic dancing, thus allowing the student to lighten the afternoon program through wise selection during the four years.

POULTRY HUSBANDRY

S 1. The Care and Management of Poultry. Credit, four hours. Lectures, daily, 9. Poultry Building 375. Laboratory, T Th F, 2-4:30. Poultry Building. Mr. BANNER.

Designed for teachers in vocational schools. The course consists of 36 lectures and preliminary examinations, and 18 laboratory practice periods as they would be taught in one term of high school, and includes a general discussion and practical application of the principles of incubation; brooding; rearing; feeding; breeding for constitutional vigor, egg production, and fancy; marketing; housing; and general poultry farm management. Laboratory fee, \$3.

S 2. Farm Poultry. Credit, one hour. Lectures, M W, 10, Poultry Building 375. Laboratory, Th, 2-4:30, Poultry Building 300. Mr. BANNER.

An abbreviated course dealing with the most important principles of Poultry Husbandry and their application on the farm. Laboratory fee, \$1.

S 3. Feeding Practice. Credit, one hour. Must be accompanied by course S 1 or S 2. Practice, three 30-minute periods a day, including Sunday, for six weeks; morning, 7:30-8:15; noon, 12:45-1:30; night, 4:30-5:00. Poultry Building. Mr. BANNER and Mr. ANDREWS.

Practice in feeding for egg production and for fattening; includes preparation for market, record-keeping, and general care and management of fowls. Assigned reading and a written examination will be required. Laboratory fee, \$1.

S 4. Incubating Practice. Credit, one-half hour. Must be accompanied by course S 1 or S 2. Practice, three 30-minute periods a day, including Sunday, for three weeks; morning, 7:30-8:15; noon, 12:45-1:30; night, 4:30-5:00. Poultry Buildings. Mr. BANNER and Mr. ANDREWS.

Practice in operating incubators; disinfecting, keeping record, testing eggs, and general management of the hatch. Assigned reading and a written examination will be required. Laboratory fee, \$1.

S 5. Brooding Practice. Credit, one-half hour. Must be accompanied by course S 1 or S 2. Practice, three 30-minute periods a day, including Sunday, for three weeks; morning, 7:30-8:15; noon, 12:45-1:30; night, 4:30-5:00. Poultry Buildings. Mr. BANNER and Mr. ANDREWS.

Practice in feeding, brooding, and caring for young chicks; keeping of temperature, food, and growth records. Assigned reading and a written examination will be required. Laboratory fee, \$1.

RURAL ECONOMY

S 4. The Rural Problem. Credit, two hours. Prerequisites: for regular students, junior standing and Political Science 51; for mature students, the permission of the Department. Lectures, required reading, and reports. Daily except Sat., 10. Forestry 210. Professor LAUMAN. Not accepted as a substitute for course 4 during the regular academic year.

A brief survey of the structure and particularly the functioning of the rural community, chiefly with reference to economic problems, such as colonization, land tenures, rural credit, and marketing.

S 8. Cooperation. Credit, two hours. Prerequisites as above. Lectures, required reading, and reports. Daily except Sat., 12. Forestry 122. Professor LAUMAN.

A study of the fundamentals of cooperation; the theory and practice of the organization and management of cooperative enterprises, chiefly economic.

RURAL EDUCATION

The work of this department is planned to meet the professional needs of teachers of vocational agriculture and home-making, and of those engaged in the supervision of such work. The technical courses for persons preparing to teach in vocational schools of agriculture and homemaking are offered in other departments of the College. Professor W. F. Lusk, Caldwell Hall 282, will help those desiring advice regarding the technical courses they should take to prepare for vocational teaching under the Smith-Hughes Act.

S 1. Educational Psychology. Credit, two hours. Discussions, daily except Sat., 8. Caldwell Hall 100. Professor KRUSE.

The original nature of man, reflexes, instincts, and inborn capacities; laws of learning and habit formation; acquisition of motor control; practice and improvement; memory; transfer of training; mental fatigue; individual differences.

S 2. Principles of Teaching. Credit, two hours. Discussions, daily except Sat., 10. Caldwell Hall 143. Professor KRUSE.

The application of the laws of psychology to the problems of teaching. Attention, interest, motive, organization of material, use of types, the problem and the project, drill, discipline, planning class work, questioning, recognition of individual differences, measuring the results of teaching.

S 3. Agriculture in New York State High Schools. Credit, two or three hours. Students should consult with the instructor before enrolling for this course. Lectures and discussions, daily except Sat., 10. Laboratory, T Th, 2:00-4:30. Caldwell Hall 282. Mr. GETMAN.

A study of the purposes of vocational agriculture, organization of subject matter, textbooks, home projects, and extension work with particular reference to conditions in high schools of New York State.

S 4. Home Economics in the Day, Part-time, and Evening Schools. Credit, two hours. Lectures and discussions, daily except Sat., 11. Caldwell Hall 143. Miss BINZEL.

This course treats of courses of study, organization of subject matter, laboratory and practical work, and textbooks as they relate to the problems of teaching home economics in secondary schools.

S 6. Problems of Instruction in Vocational Agriculture. Credit, one hour. Lectures and discussions, M W F, 12. Open only to those who have had experience in teaching vocational agriculture. Caldwell Hall 282. Mr. GETMAN.

A detailed consideration of the special problems of the teacher of vocational agriculture. The course treats courses of study, adaptation of instruction to local agricultural needs, project work, and school plot.

S 12. Social and Vocational Aspects of Education. Credit, two hours. Daily except Sat., 11. Farm Management Building. Professor STEWART.

A course designed to aid prospective supervisors, directors, and teachers of agriculture and home economics to discover certain principles fundamental to interpretation in education. Emphasis is placed upon the social and vocational elements in educational procedure, the responsibility of the school in utilizing these elements, the re-adjustment of the school to meet the demands of changing social and vocational activities, the selection of subject-matter with reference to these activities; and the analysis of methods involved in the various school practices, such as major activities, or projects.

S 14. Organization of College Departments of Agricultural Education. Credit, two hours. Lectures and discussions, daily except Sat., 9. Consult with instructor before registering for this course. Caldwell Hall 282. Professor LUSK.

This course is designed for those preparing for teaching in college departments of agricultural education. It deals with study of agricultural college and high school courses in agriculture with respect to the technical preparation of teachers of secondary agriculture, the professional needs of the high school teacher of agriculture, practice teaching, graduate needs to be met by such departments, and the content of special methods course in agricultural education.

S 15. Organization of Teacher Training in Home Economics. Credit, two hours. Lectures and discussions, daily except Sat., 9. Caldwell Hall 143. Miss BINZEL and Miss STANLEY.

A consideration of the problems in organization of Home Economics for all-day, part-time, and evening classes; curricula, courses of study, and preparation of teachers for the various types of school will be treated.

S 18. State and County School Administration and Supervision. Lectures and discussions, M W F, 11. Credit, one hour. Farm Management Building. Dr. BUCKNER.

A study of the educational problems confronting state, county, and township or district administrators and supervisors. Taxation, distribution of funds, courses of study, and certification of teachers are considered.

S 20. Administration and Supervision of Vocational Agriculture. Credit, two hours. Daily except Sat., 8. Caldwell Hall 143. Professor WORKS.

This course is designed for persons who are engaged in supervision of vocational agriculture or those planning to enter such work. It treats administration and supervision of agricultural education under the Vocational Education Act, state legislation, related federal legislation, curricula. Visits to schools in New York and adjacent states are required as a part of the course.

S 21. Administration and Supervision of Vocational Home Economics. Credit, two hours. Lectures and discussions, daily except Sat., 10. Caldwell Hall 143. Miss RICHARDSON and Miss BAYLOR.

This course is planned especially to meet the needs of supervisors of home economics. The topics treated are legislation, types of schools, supervisory plans, and courses of study.

S 50. School and Home Gardens. Credit, one hour. Lectures and discussions, M W F, 9. Practice period, M, 6:45 to 9 p. m. Poultry Building 325. Mrs. SIPE ALBURTIS.

This course will emphasize the educational value of gardens; their relation to other departments of school activities; the garden as a laboratory for nature study; class management; vacation gardens; supervision of school and home gardens; and the many problems that arise in the establishment and management of children's gardens.

Teachers planning to teach elementary agriculture and school gardening or those entering upon supervisory work will find this a practical course. Weekly conferences will be held for the discussion of individual problems.

S 51. Practice Teaching in School Gardening. Credit, one hour. Lectures and discussions, T Th, 9. Poultry Building 325. Laboratory, 6:45 to 9 p. m. Mrs. SIPE ALBURTIS.

Students will have opportunity for observation and teaching in the children's gardens. This garden will permit of practical demonstrations of class management in the various seasonal operations, viz., seed planting for succession of crops, transplanting, harvesting, and canning.

RURAL ENGINEERING

S 5. Farm Mechanics and Engineering. Credit, two hours. Lectures, daily except Sat., 9. Caldwell Hall 100. Laboratory, T Th, 2-5. Professor RILEY and Mr. STRAHAN.

This course is designed to meet the needs of vocational teachers of agriculture and will not be accepted as a substitute for the regular course of the department.

A study of the applications of the simpler phases of mechanics, surveying, and leveling to the farm. Laboratory exercises will be given in rope work, belt lacing, pumps, water supply systems, internal combustion engines, tillage implements, leveling for farm drainage, concrete construction, sanitation, and sewage disposal.

S 41. Farm Shop Work. Credit, one hour. Open to teachers of vocational agriculture. M W F, 2-5. Farm Shop. Mr. ROEHL.

A course in woodwork and drawing designed to prepare men to handle the farm shop work of a vocational course in agriculture.

RURAL ORGANIZATION

S 1. The Social Problems of Rural Communities. Credit, two hours. Lectures, reports, and discussions, daily except Sat., 8. Animal Husbandry B. Professor SANDERSON.

An introductory study of the social problems of rural communities as a basis for the social organization of rural life. Students will make individual studies of selected communities.

SOIL TECHNOLOGY

S 3. Soils. Three periods. Credit, one hour. Lectures, W F, 11. Caldwell Hall 143. Laboratory and demonstrations, T, 2-4:30. Mr. MARTIN.

This course is not open to regular students in the college nor will students taking this course be permitted to apply it toward credit on any regular course of the department. It is designed primarily for students taking gardening.

A practical, fundamental course in soils. The subject will be handled with special reference to the needs of those expecting to teach soils in secondary schools. The lectures will include a discussion of the formation and classification of soils, tilth, soil moisture, soil biology, soil amendments, manures and fertilizers, and practical soil management. The laboratory once a week will give opportunity for questions and practical discussions.

SCHOOL GARDENING

The war has greatly stimulated the interest in school and home gardening. As a consequence there is a pronounced demand for trained men and women to act as supervisors of this work. The New York State College of Agriculture offers the following courses for persons who desire to prepare for such positions:

FIRST YEAR

Course	Credits	Page
Vegetable Gardening S 1.	3	79
Floriculture S 1.	1	62
Soils S 3.	1	78
Nature-Study S 1.	2	66
Rural Education S 50.	1	77

SECOND YEAR

Course	Credits	Page
Vegetable Gardening S 2.....	1	79
Floriculture S 3.....	1	62
Nature-Study S 4.....	2	66
Rural Education S 51.....	1	77
Floriculture S 2.....	1	62
Nature-Study S 3.....	1	66

Persons who satisfactorily complete the two years of work will be given a certificate of proficiency.

Mrs. Sipe Alburtis will be in Room 282, Caldwell Hall, during registration days to advise with students regarding preparation for this work. Those desiring further information in advance of the opening of the summer school may write to Professor George A. Works, College of Agriculture, Ithaca, N. Y.

VEGETABLE GARDENING

S 1. **Vegetable Gardening.** Credit, three hours. Lectures, M W, 9, T Th F, 8. Poultry Building 325. Laboratory, T Th, 9-12. Vegetable Gardens, East Ithaca.

This course is planned primarily to meet the requirements of those interested in school and social service work in vegetable gardening, as well as of the amateur gardener.

A study of the principles and practices of gardening as applied to the culture of vegetables in the home and school garden.

The location, planning, and management of a garden; seed and seed handling; growing early plants; special requirements of the various vegetable crops; and insects and diseases will receive consideration.

The laboratory work includes actual practice in the garden. Each student is assigned a plot on which he will plant and care for, throughout the course, the vegetables which are best suited for school and amateur gardens. Laboratory exercises are planned to show the application of principles and practices discussed in the lectures. Laboratory fee, \$2.

S 2. **Advanced Vegetable Gardening.** Credit, one hour. Prerequisite, Course S 1. Lectures and Laboratory, T Th, 2-5. Poultry Building 325 and Vegetable Gardens, East Ithaca.

Lectures on the origin, history, and botany of vegetables. Lectures and laboratory studies of different vegetable types and varieties, their characteristics and adaptation to different conditions. Important varieties of all the different vegetables are grown in the garden giving an abundance of material for study. Preparing and judging exhibits. Special study of training, blanching, harvesting and storing of different vegetables. One or two trips will be made to study the most successful home and school gardens of Ithaca. Laboratory fee, \$1.50

ZOOLOGY

The work in the department of Zoology as announced on page 38 is open, without tuition charge to students registered in the College of Agriculture Summer School.

INDEX

	PAGE		PAGE
Admission	6, 57	Italian	16
Agriculture	55-78	Laboratory Fees	7
American Government.	26	Landscape Art.	66
American History.	26	Latin	12
Animal Husbandry.	57	Libraries	10
Athletics.	71	Living	9
Bacteriology	58	Mathematics	28, 29
Banking	27	Mechanical Drawing.	45
Biology	58	Mechanics of Engineering.	46
Board and Rooms.	9, 10	Money and Credit.	27
Botany	58	Music.	47-53
Certificates of Work.	9	Nature-Study.	66
Chemistry	33-38, 60	Object of Session.	6
Civil Engineering	46	Oral English.	20
Cost of Living.	9	Ornithology	39
Credit for Work.	8, 57	Philosophy	21
Dairy Industry	61	Physical Education.	67
Descriptive Geometry	46	Physical Geography	41, 42
Design.	45	Physical Training.	44, 67
Drawing and Design.	45	Physics	29-33
Earth Science.	39-43	Physiology	39
Economics	27	Pomology	72
Education.	23, 24	Poultry Husbandry.	74
Engineering	46	Psychology	21-23
English.	17-19	Public Speaking.	20
English History.	25	Railroad Routes.	11
Entomology	62	Registration.	6
Excursions	11, 42	Residential Halls.	9, 10
Expenses	7, 9, 10	Rural Economy.	74
Fees	7, 57	Rural Education.	75-77
Floriculture	62	Rural Engineering.	77
Forestry	63	School Gardening.	77
French	14, 15	Social Science.	26
General Lectures.	11	Soil Technology.	77
Geography.	39	Spanish	16
Geology	41	Speaking and Reading.	20
German.	13	State Examinations.	23
Graduate Work.	8	Swimming and Fencing.	44
Greek	12	Tuition	7, 57
History.	25, 26	Vegetable Gardening.	78
Home Economics.	63-65	Voice Training.	20
Hygiene.	68	Zoology	38

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The Register (for the year 1918-1919, published January 1, 1919). price 50 cents.

Directory of Faculty and Students, Second Term, 1918-1919, price 10 cents.
Book of Views, price 25 cents.

Any of the following informational pamphlets will be sent gratis and post-free on request. The date of the last edition of each is given after the title.

General Circular of Information for Prospective Students, January 15, 1919.
Announcement of the College of Arts and Sciences, April 15, 1918.

Announcement of Sibley College of Mechanical Engineering and the Mechanic Arts, February 15, 1919.

Announcement of the College of Civil Engineering, April 1, 1918.

Announcement of the College of Law, February 1, 1919.

Announcement of the College of Architecture, July 1, 1917.

Announcement of the New York State College of Agriculture, June 1, 1918.

Announcement of the Winter Courses in the College of Agriculture, June 15, 1918.

Announcement of the Summer Term in Agriculture, March 15, 1918.

Announcement of the New York State Veterinary College, May 15, 1918.

Announcement of the Graduate School, March 1, 1919.

Announcement of the Summer Session, April 1, 1919.

Annual Report of the President, September 1, 1918.

Pamphlets on prizes, samples of entrance and scholarship examination papers, special departmental announcements, etc.

Announcement of the Medical College may be procured by writing to the Cornell University Medical College, Ithaca, New York.

Correspondence concerning the Cornell University Official Publication should be addressed to

The Secretary of Cornell University,
Ithaca, New York.